



WWC-5 Forms and KOLAR: Location Reporting

Daniel Suchy and Debora Stewart
Kansas Geological Survey
September 2016



**The Data Resources Library
at the Kansas Geological Survey**

Topics

- KGS WWC-5 website
- Section, Township, Range
- Latitude/Longitude Coordinate Systems
- Datums
- GPS



**The Data Resources Library
at the Kansas Geological Survey**

KGS Home Page



**KANSAS GEOLOGICAL SURVEY**
The University of Kansas

Google™ Custom Search

▶ **Water**
High Plains/Ogallala Aquifer, WWC5, WIZARD, WIMAS, Publications, ...

▶ **Energy**
Oil and Gas Wells, Production, Interactive Maps, Other Projects, ...

▶ **Geology**
County Maps, County Bulletins, Publications, Nomenclature, ODYSSEY Archaeological Research, ...

▶ **Geophysics**
Russell 4D Seismic, Shallow Seismic, WinSeis, SurfSeis, Earthquakes, ...

▶ **Publications**
Bibliography, Open-file Reports, Maps/GIS, LEOWEB, Software, ...

▶ **Education**
GeoKansas, Photo Library, Annual Field Conferences, ...

▶ **About the KGS**
Positions Available, News, Staff Listing, FAQ, KGS Staff Only, ...

Geologic Map for Morris County Now Available

[more...](#)

News

- ▶ **Magnitude 2.7 earthquake at 9:38 PM, Mon., Aug. 29, located 3 mi ENE of Caldwell; details from USGS.**
- ▶ **Oil and gas production data through May 2016 added Aug. 27, 2016.**
- ▶ **New in "Current Research"--Classification of Red Beds at Point of Rocks, Morton County, Kansas: A Historical Review, by Robert S. Sawin**
- ▶ **Kansas Geological Survey Map Wins Awards at Professional Conference**
- ▶ **KGS featured in National Geographic article on the High Plains aquifer**
- ▶ **Search underway for the next Director of the Kansas Geological Survey**
- ▶ **Resources on Induced Seismicity--the KGS presents these links to help people learn about induced seismicity, or earthquakes somehow created or triggered by actions of humans.**

Links

**GeoKansas**
**Data Access and Support Center**

Kansas By County, State Geological Surveys, Kansas Sites, Universities, Professional Organizations, more...

Kansas Geological Survey,
1930 Constant Ave., Lawrence, KS 66047-3724
phone 785-864-3965, fax 785-864-5317,
Core Library 785-864-4909

Wichita Well Sample Library,
4150 W. Monroe Street, Wichita, Kansas 67209-2640
phone 316-943-2343, fax 316-943-1261

www.kgs.ku.edu

KGS Water Page

▶ Water

- ▶ High Plains/Ogallala Aquifer
- ▶ Other Projects, aquifers
- ▶ WIMAS Database
- ▶ WWC5 Database
- ▶ Interactive Map
- ▶ WIZARD Database
- ▶ Master Inventory
- ▶ Publications
- ▶ Water Web Links
- ▶ Staff Listing

▶ Energy

▶ Geology

▶ Geophysics

▶ Publications

▶ Education

▶ About the KGS

Geohydrology Section and Water Resources Information



Newest Items

Open-file Report 2016-19, Western Kansas GMD1 maps, by J. J. Woods and B. B. Wilson

Open-file Report 2016-4, High Plains Aquifer Index Well Program: 2015 Annual Report, by J. J. Butler, Jr., D. O. Whittemore, E. Reboulet, S. Knobbe, B. B. Wilson, R. L. Stotler, and G. C. Bohling

Open-file Report 2016-3, Minimum Saturated Thickness Calculator: Method Overview and Spreadsheet Description, by Andrea Brookfield

Bulletin 260, Water Resources of the Dakota Aquifer in Kansas, by Donald O. Whittemore, P. Allen Macfarlane, and Blake B. Wilson. [News release](#) also available.

KU Hydrogeology Program--a cooperative program with the KU Department of Geology to teach and mentor students in hydrogeology

Water research at the University of Kansas: <http://www.water.ku.edu/>

Click on “WWC5 Database.”

WWC-5 Search Page

<http://www.kgs.ku.edu/Magellan/WaterWell/index.html>

s (WWC5) Database

ls. In Kansas, Township values vary from 1 in the north to 35 in the south, and the values for Range are from 1-43 West and 1-25 East. Values for Section are
[library](#).

Choose wells by entering a legal description OR county name.	
<div>Legal Description</div> <div>Township: <input type="text" value="16"/> South</div> <div>Range: <input type="text" value="38"/> East: <input type="radio"/> or West: <input checked="" type="radio"/></div> <div>Section (optional): <input type="text" value="16"/></div>	<div>County</div> <div><input type="text" value="Allen"/> Anderson Atchison Barber Barton</div>
<input type="button" value="Select by T-R"/>	<input type="button" value="Select by County"/>

[Interactive Map](#) of WWC5 data

[Database of Water Well Contractors](#)

[Status maps of WWC5 database](#), Updated
Aug. 1, 2016

[Statewide statistics of wells drilled](#) (query may
take a while)

[Water Use Code Statistics](#) (query may take a
while)

Can search by Section, Township, and Range; or by County.

List of wells for Section 16, Township 16S, Range 38W

7, Section: 16
ew details.
to sort.

Save Data
to File

T-R-S	Owner	Well Depth Ascend. Desc.	Static Water Level Ascend. Desc.	Est. Yield Ascend. Desc.	Well Use	Other ID	Action Taken	Completion Date Ascend. Desc.	Scan?
Sec. 16 SW SW SW	Watt, Jr.	180 ft.	120 ft.	10 gpm.	Domestic		Constructed	23-Jun-1976	PDF
Sec. 16 SW NE	Watt, Betty	212 ft.	65 ft.		Irrigation		Plugged	17-Dec-2004	PDF
Sec. 16 SW SW NE	VMW Land Trust	222 ft.			Irrigation		Reconstructed	03-Aug-2004	PDF
Sec. 16 NE SW SW SW	University of Kansas	200 ft.	165 ft.		Monitoring well/observation/piezometer	Monitoring	Constructed	01-Apr-2016	KOLAR PDF
Sec. 16 NW SW SW SW	Watt, Judd	200 ft.	165 ft.	20 gpm.	Domestic, Livestock		Constructed	09-Jun-2016	KOLAR PDF

- List can be sorted by column heading.
- Can get to individual well page by clicking on location link on the left.
- Can see scanned image of WWC-5 by clicking on “PDF” or “Scan” or “KOLAR PDF” link on the right (Also can get to it from the individual well page).

Individual Well Page

chasm.kgs.ku.edu/ords/wwc5.wwc5d2.well_details?well_id=500268

KGS
Hydrology

Water Well Database Query

Specific Water Well Detail

Well T16S, R38W, Sec. 16, NE SW SW SW, Action: Constructed

Location Info		
Owner: University of Kansas	Status: Constructed	
Location: T16S, R38W, Sec. 16, NE SW SW SW	County: Wichita	
Directions: From intersection of highway 96 & 25 in Leoti Kansas, 12.1 miles North to road D, then 8.8 miles West on road D and 500ft North to flagged location		
Longitude: -101.52963	Latitude: 38.65689	Datum NAD 27
Longitude and latitude from GPS measurements.		
GPS Longitude: -101.52963	GPS Latitude: 38.65689	Datum NAD27
View well on interactive map This link will create a new window and display an interactive map of this well and its neighbors.		

General Info	
Well Depth: 200 ft.	Elevation: 3448 ft.
Static Water Level: 165 ft.	Est. Yield: gpm.
Comp. Date: 01-Apr-2016	Well Use: Monitoring well/observation/piezometer
DWR Applic. #:	Other ID: Monitoring

Driller Info	
Driller: Hydro Resources Mid Continent, Inc.	License #: 145

Scanned Form	
View scan of this form in PDF format.	
You will need the Acrobat PDF Reader , available free from Adobe, to read this file.	

Click on link for
scanned image
of WWC-5



PDF image of WWC-5 for this well, generated in KOLAR (note bar code at top)

File Edit View History Bookmarks Tools Help

http://www...00268.pdf

www.kgs.ku.edu/Hydro/WWC5/W/16538/500268.pdf

This file includes fillable fields. You can print the completed form and save it to your device or Acrobat.com.

Fill & Sign Comment

Highlight Existing Fields

WATER WELL RECORD Form WWC-5 1304626

☒ Original Record ☐ Correction ☐ Change in Well Use

Division of Water Resources App. No. Well ID Monitoring

1 LOCATION OF WATER WELL: County: Wichita

Fraction NE 1/4 SW 1/4 SW 1/4 SW 1/4 Section Number 16 Township Number T 16 S Range Number R 38 ☐ E ☒ W

2 WELL OWNER: Last Name: University of Kansas First: Street or Rural Address where well is located (if unknown, distance and direction from nearest town or intersection): If at owner's address, check here: ☐
 Business: University of Kansas
 Address: 1246 W Campus Rd Room 20
 Address:
 City: Lawrence State: KS ZIP: 66045
 From intersection of highway 96 & 25 in Leoti Kansas, 12.1 miles North to road D, then 8.8 miles West on road D and 500ft North

3 LOCATE WELL WITH "X" IN SECTION BOX: N

-- NW --		-- NE --	
W			E
-- SW --		-- SE --	
	X		
S			

-----1 mile-----

4 DEPTH OF COMPLETED WELL: 200 ft.
 Depth(s) Groundwater Encountered: 1) 165 ft.
 2) ft. 3) ft., or 4) ☐ Dry Well
 WELL'S STATIC WATER LEVEL: 165 ft.
☒ below land surface, measured on (mo-day-yr) 4/1/2016
☐ above land surface, measured on (mo-day-yr)
 Pump test data: Well water was ft.
 after hours pumping gpm
 Well water was ft.
 after hours pumping gpm
 Estimated Yield: 6.25 gpm
 Bore Hole Diameter: 6.25 in. to 200 ft. and in. to ft.

5 Latitude: 38.65689 (decimal degrees)
Longitude: 101.52963 (decimal degrees)
 Datum: ☐ WGS 84 ☐ NAD 83 ☒ NAD 27
 Source for Latitude/Longitude:
☐ GPS (unit make/model:)
 (WAAS enabled? ☐ Yes ☐ No)
☐ Land Survey ☐ Topographic Map
☐ Online Mapper:

6 Elevation: 3448 ft. ☒ Ground Level ☐ TOC
 Source: ☐ Land Survey ☒ GPS ☐ Topographic Map
☐ Other

7 WELL WATER TO BE USED AS:

1. Domestic: <input type="checkbox"/> Household <input type="checkbox"/> Lawn & Garden <input type="checkbox"/> Livestock 2. Irrigation <input type="checkbox"/> Food Plot	5. <input type="checkbox"/> Public Water Supply: well ID <u></u> 6. <input type="checkbox"/> Dewatering: how many wells? <u></u> 7. <input type="checkbox"/> Aquifer Recharge: well ID <u></u> 8. <input checked="" type="checkbox"/> Monitoring: well ID <u>Monitoring</u> 9. Environmental Remediation: well ID <u></u> <input type="checkbox"/> Air Sparging <input type="checkbox"/> Soil Vapor Extraction	10. <input type="checkbox"/> Oil Field Water Supply: lease <u></u> 11. Test Hole: well ID <u></u> <input type="checkbox"/> Cased <input type="checkbox"/> Uncased <input type="checkbox"/> Geotechnical 12. Geothermal: how many bores? <u></u> a) Closed Loop <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical b) Open Loop <input type="checkbox"/> Surface Discharge <input type="checkbox"/> Use of Water <u></u>
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4:10 PM 8/30/2016

Individual Well Page

chasm.kgs.ku.edu/ords/wwc5.wwc5d2.well_details?well_id=500268

KGS
Hydrology

Water Well Database Query

Specific Water Well Detail

Well T16S, R38W, Sec. 16, NE SW SW SW, Action: Constructed

Location Info		
Owner: University of Kansas	Status: Constructed	
Location: T16S, R38W, Sec. 16, NE SW SW SW	County: Wichita	
Directions: From intersection of highway 96 & 25 in Leoti Kansas, 12.1 miles North to road D, then 8.8 miles West on road D and 500ft North to flagged location		
Longitude: -101.52963	Latitude: 38.65689	Datum NAD 27
Longitude and latitude from GPS measurements.		
GPS Longitude: -101.52963	GPS Latitude: 38.65689	Datum NAD27
View well on interactive map This link will create a new window and display an interactive map of this well and its neighbors.		

General Info	
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Static Water Level: 165 ft.	Est. Yield: gpm.
Comp. Date: 01-Apr-2016	Well Use: Monitoring well/observation/piezometer
DWR Applic. #:	Other ID: Monitoring

Driller Info	
Driller: Hydro Resources Mid Continent, Inc.	License #: 145

Scanned Form	
View scan of this form in PDF format.	
You will need the Acrobat PDF Reader , available free from Adobe, to read this file.	

Click on link to
plot well on
interactive map



Interactive map will open up in a new tab.

Kansas Water Wells Kansas Geological Survey

Statewide View | Zoom to Location | Filter Wells | Label Wells | Classify Wells | Download Wells | Print to PDF | Clear Highlight | Help

WATER WELL (WWC5)

County:	Wichita
Section:	T16S R38W Sec. 16
Quarter Section:	SW SW SW
Owner:	University of Kansas
Status:	Constructed
Depth:	200 ft
Elevation:	3448 ft
Static Water Level:	165 ft
Estimated Yield:	
Well Use:	Monitoring Well/Observation /Piezometer
Other ID:	Monitoring
Completion Date:	Apr-01-2016
Driller:	Henkle Drilling & Supply Co. Inc.
DWR Application Number:	
KGS Record Number:	500268

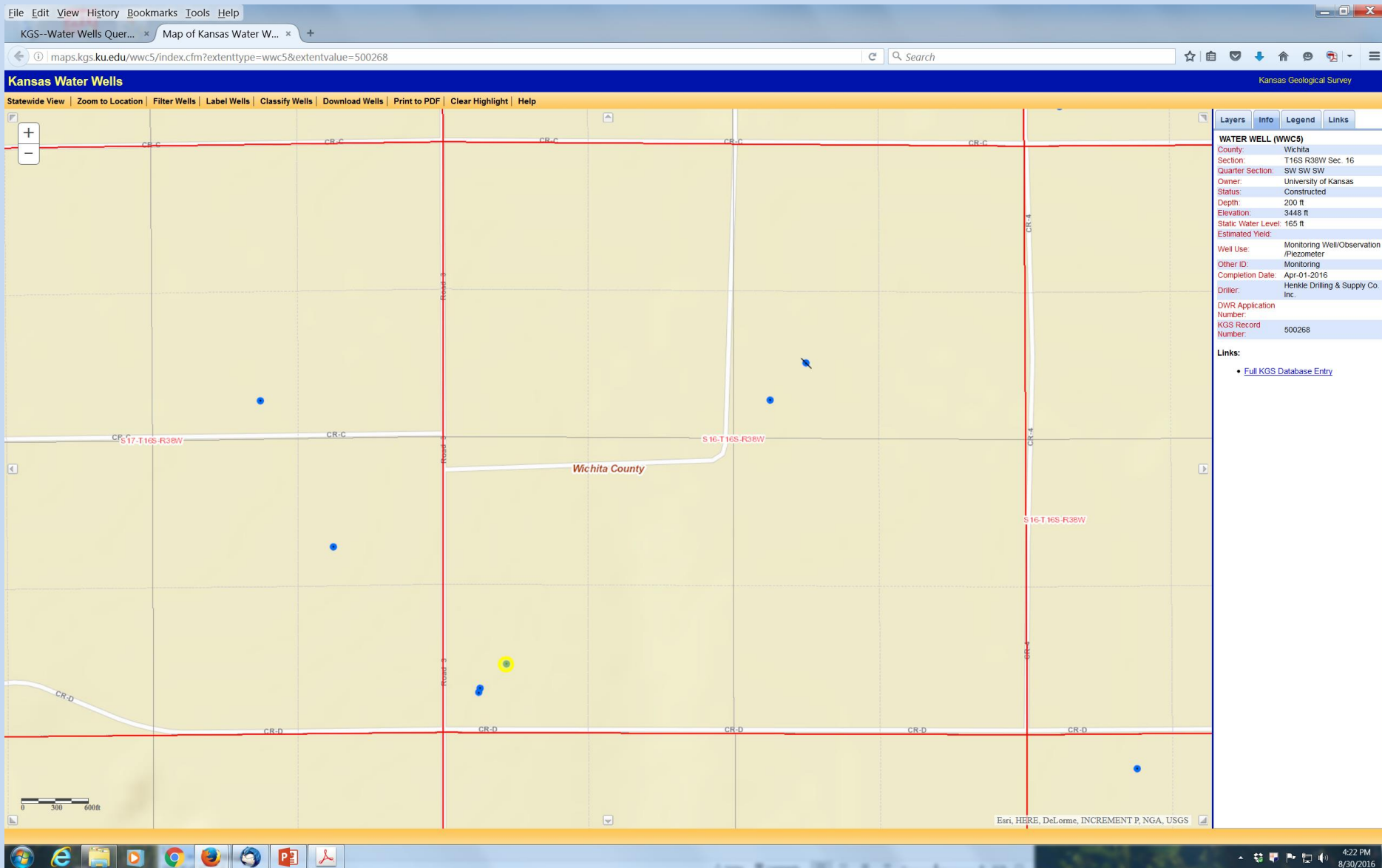
Links:

- [Full KGS Database Entry](#)

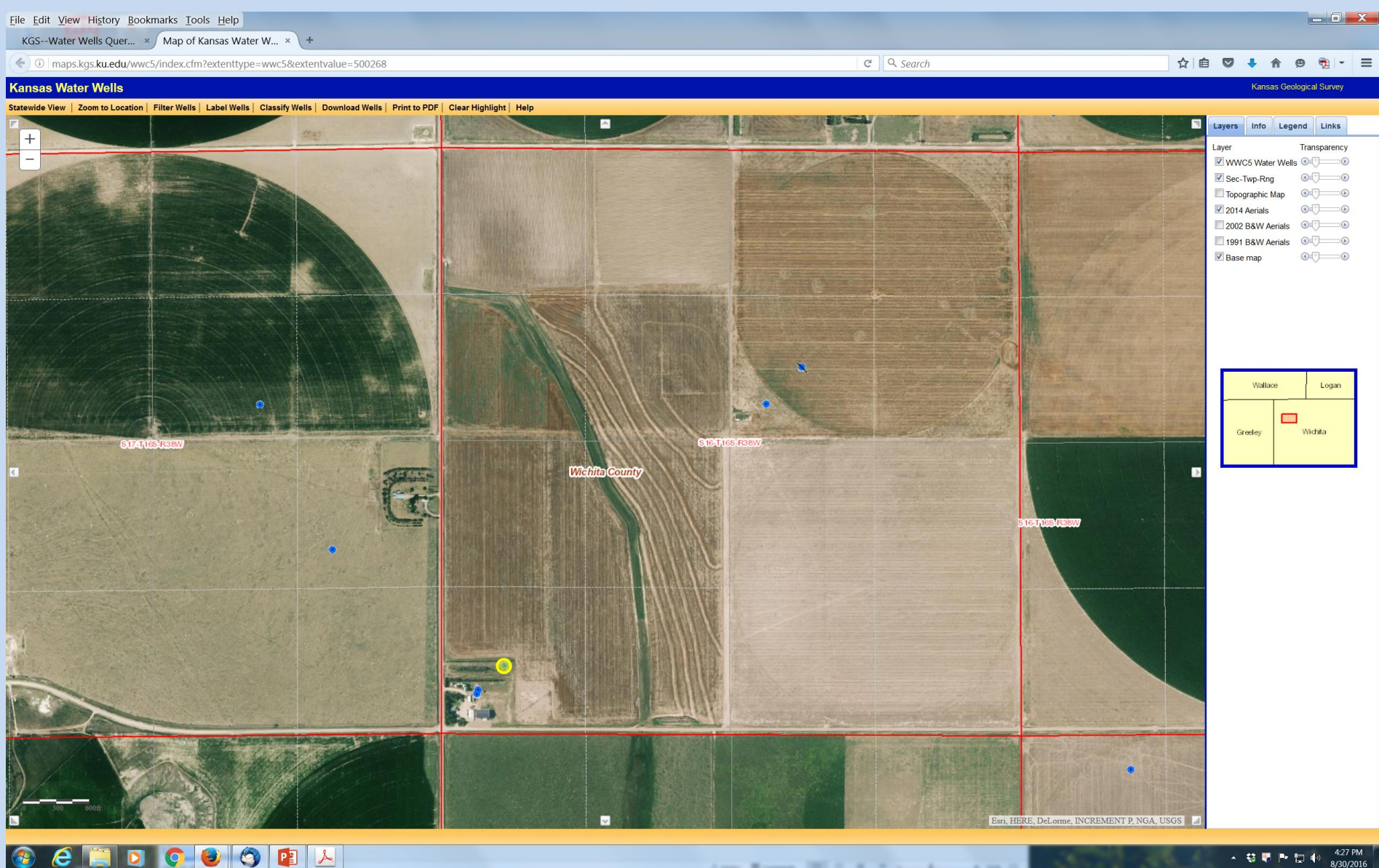
Esri, HERE, DeLorme, INCREMENT P, NGA, USGS

Well that you were looking at will be highlighted in yellow;
notice the information for that well on the right.

Features



You can click and drag the map, zoom in and out, and add a number of features.

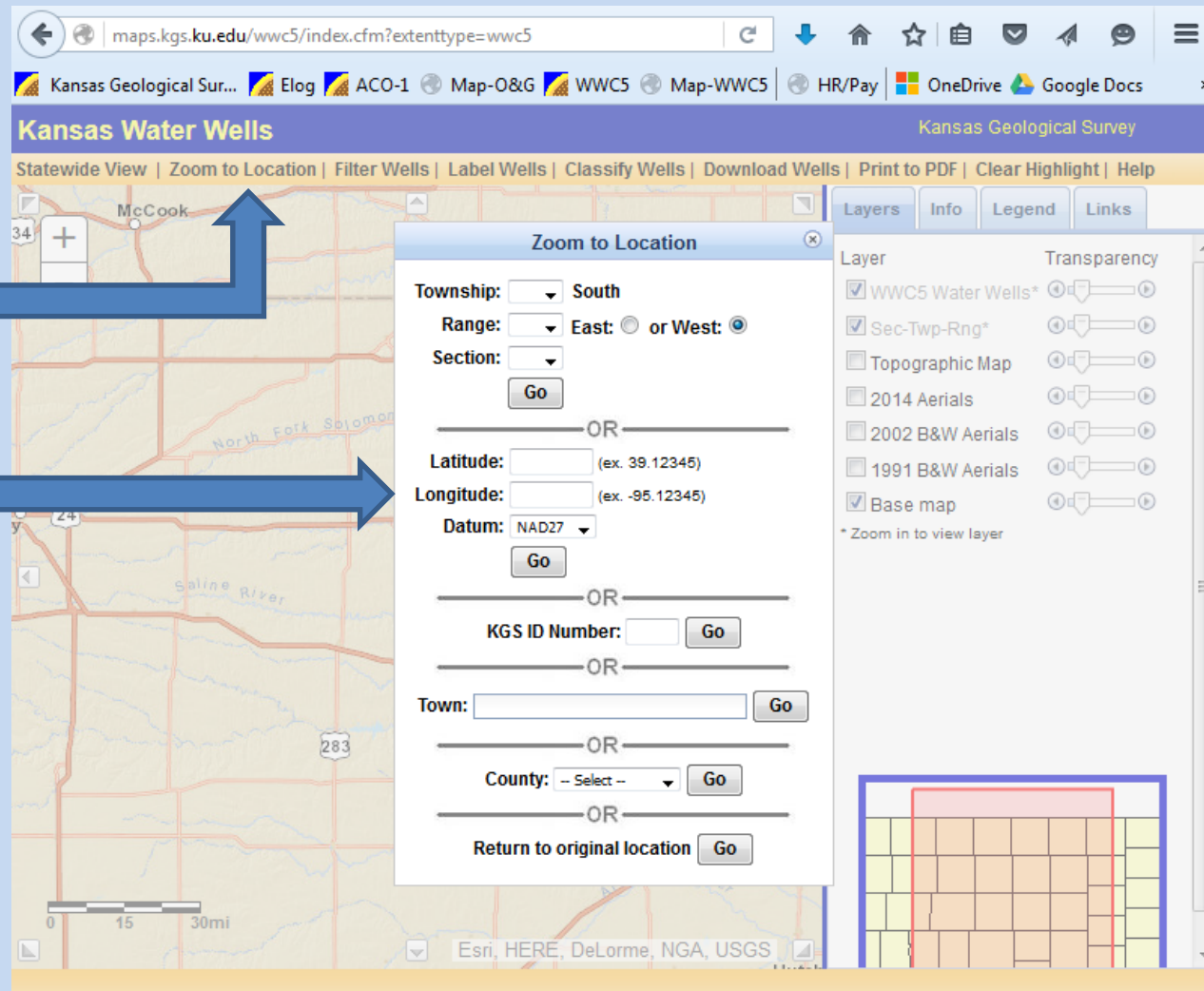


- Can add different layers using the “Layers” tab on the upper right
- Can add aerial photos
- Can add a topo map

KGS Interactive Map of WWC5 data

<http://maps.kgs.ku.edu/wwc5/index.cfm?extenttype=wwc5>

- Zoom to Location
- Enter Latitude, Longitude and Datum, then click 'Go'

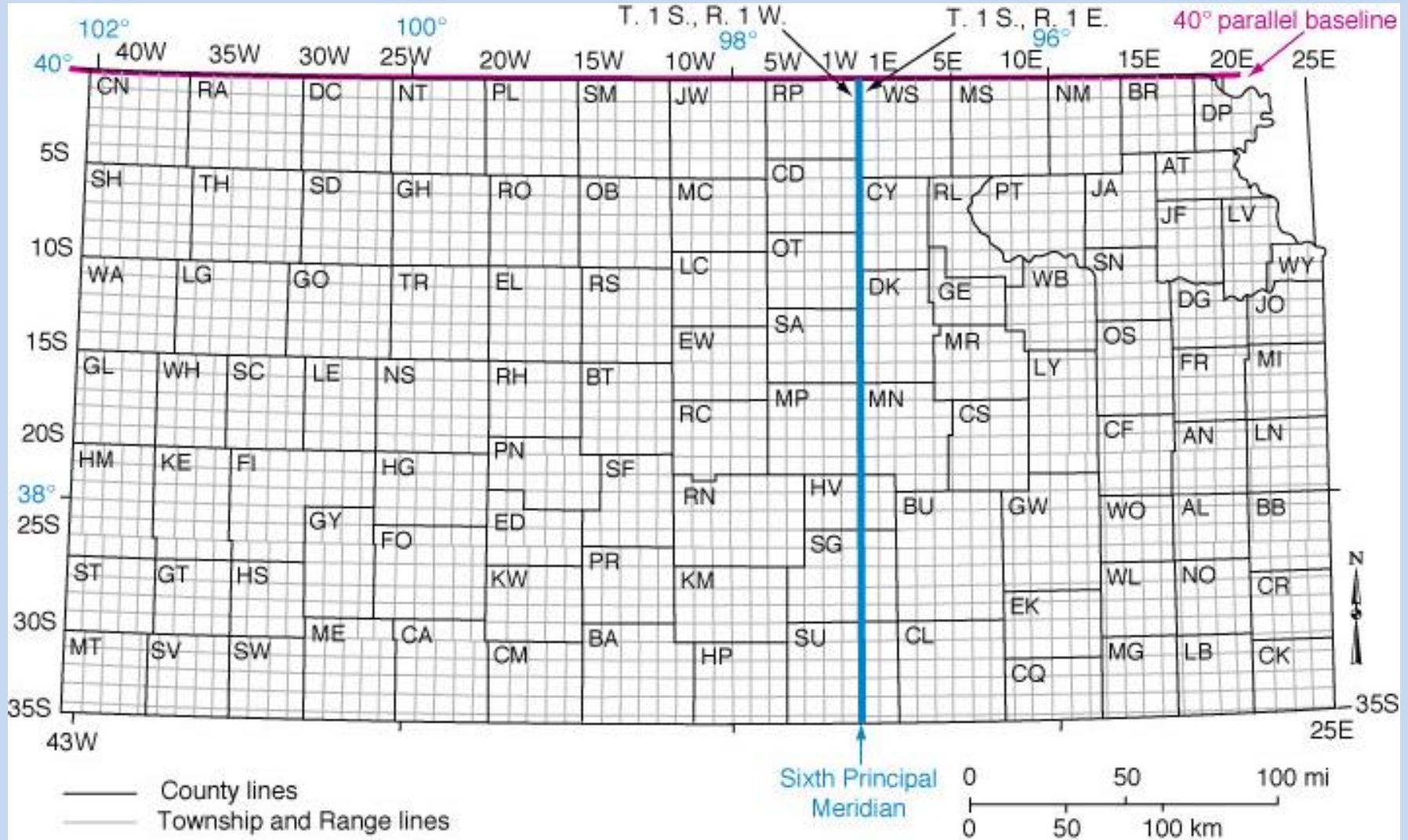


Where is that well?

Everything is location, location, location!



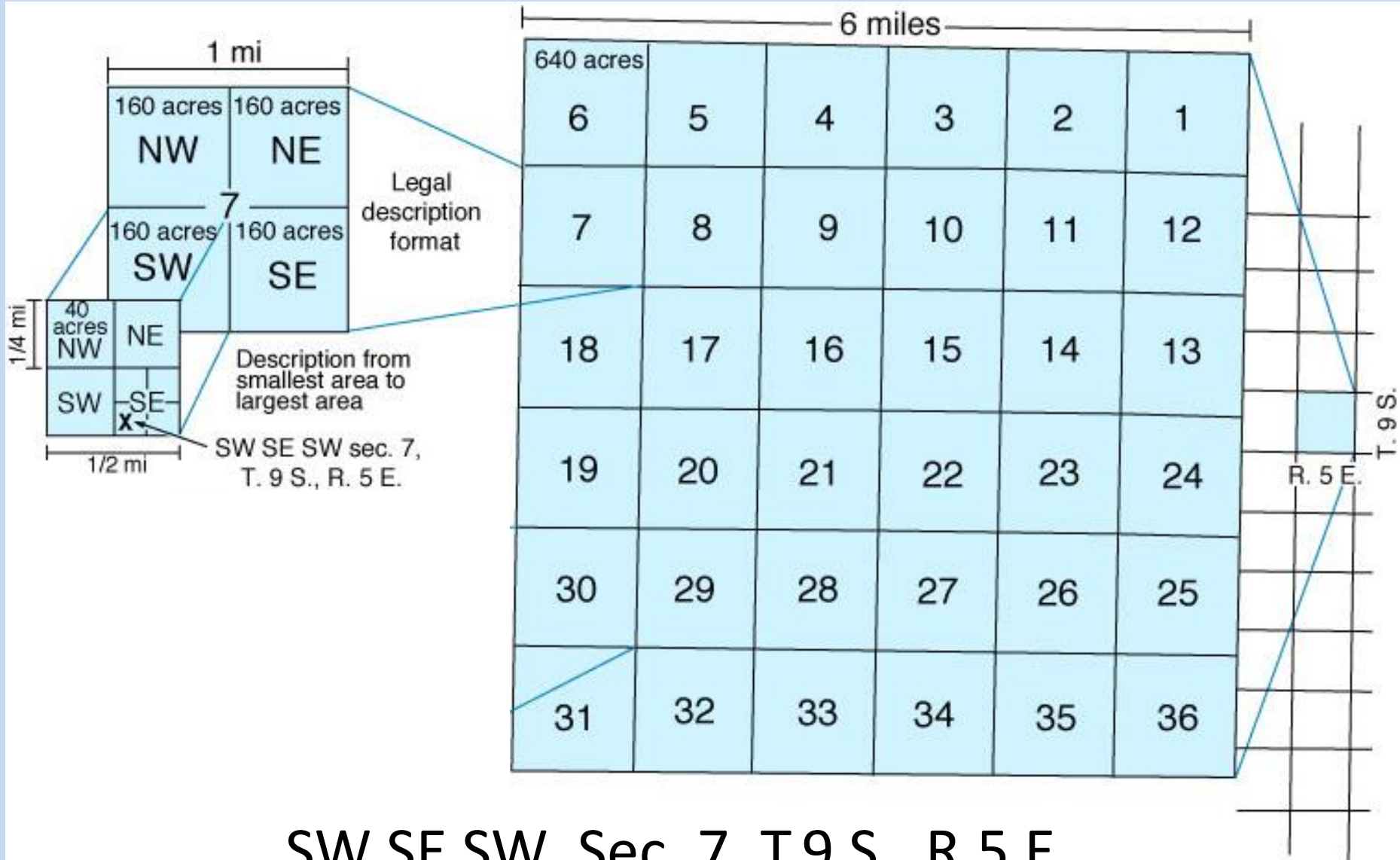
The Public Land Survey System in Kansas



Kansas Geological Survey, Public Information Circular (PIC) 20

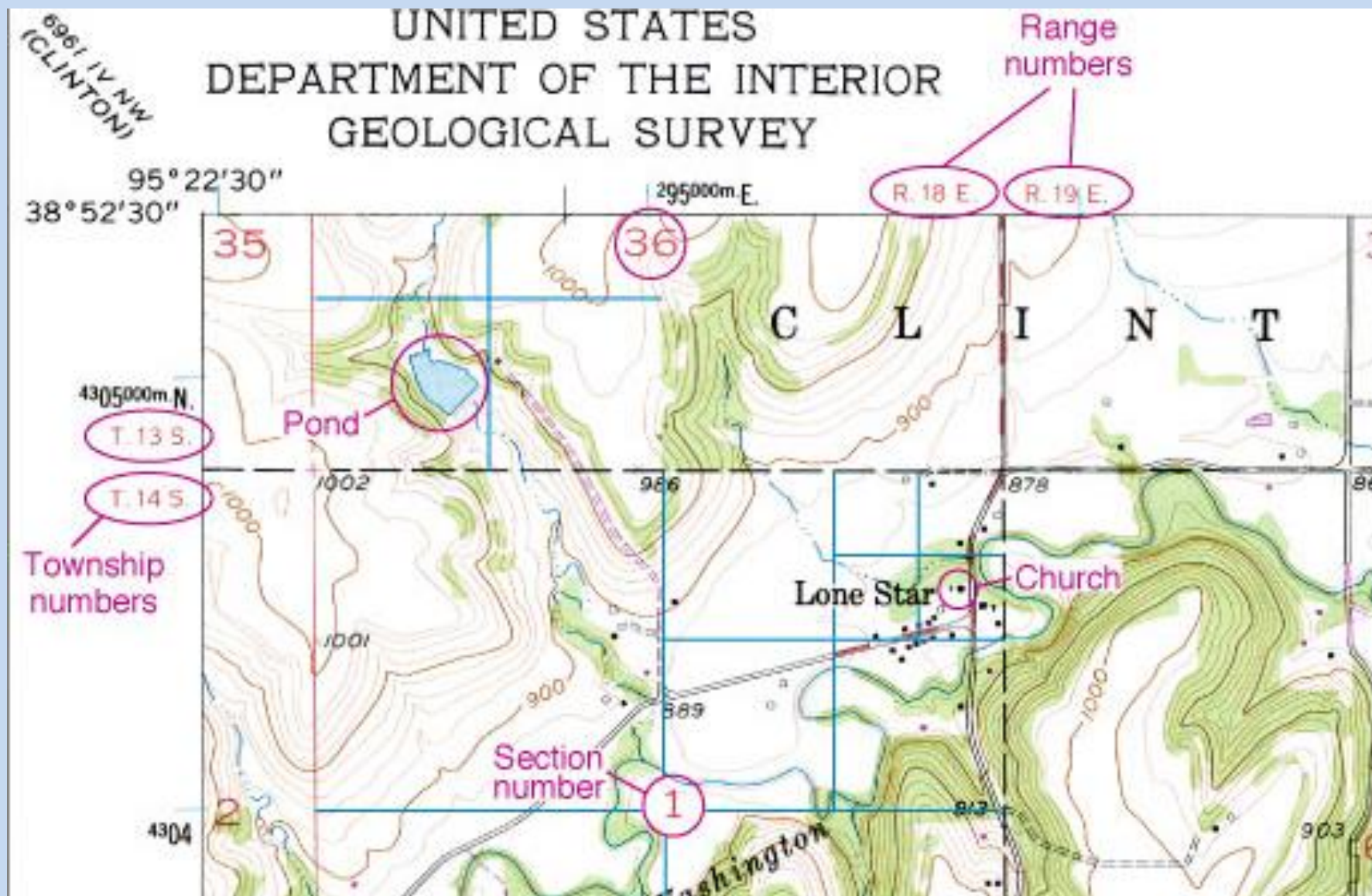
http://www.kgs.ku.edu/Publications/pic20/pic20_1.html

Section, Township, and Range



SW SE SW Sec. 7, T.9 S., R.5 E.

USGS Topo. Map, small area in Douglas County, KS



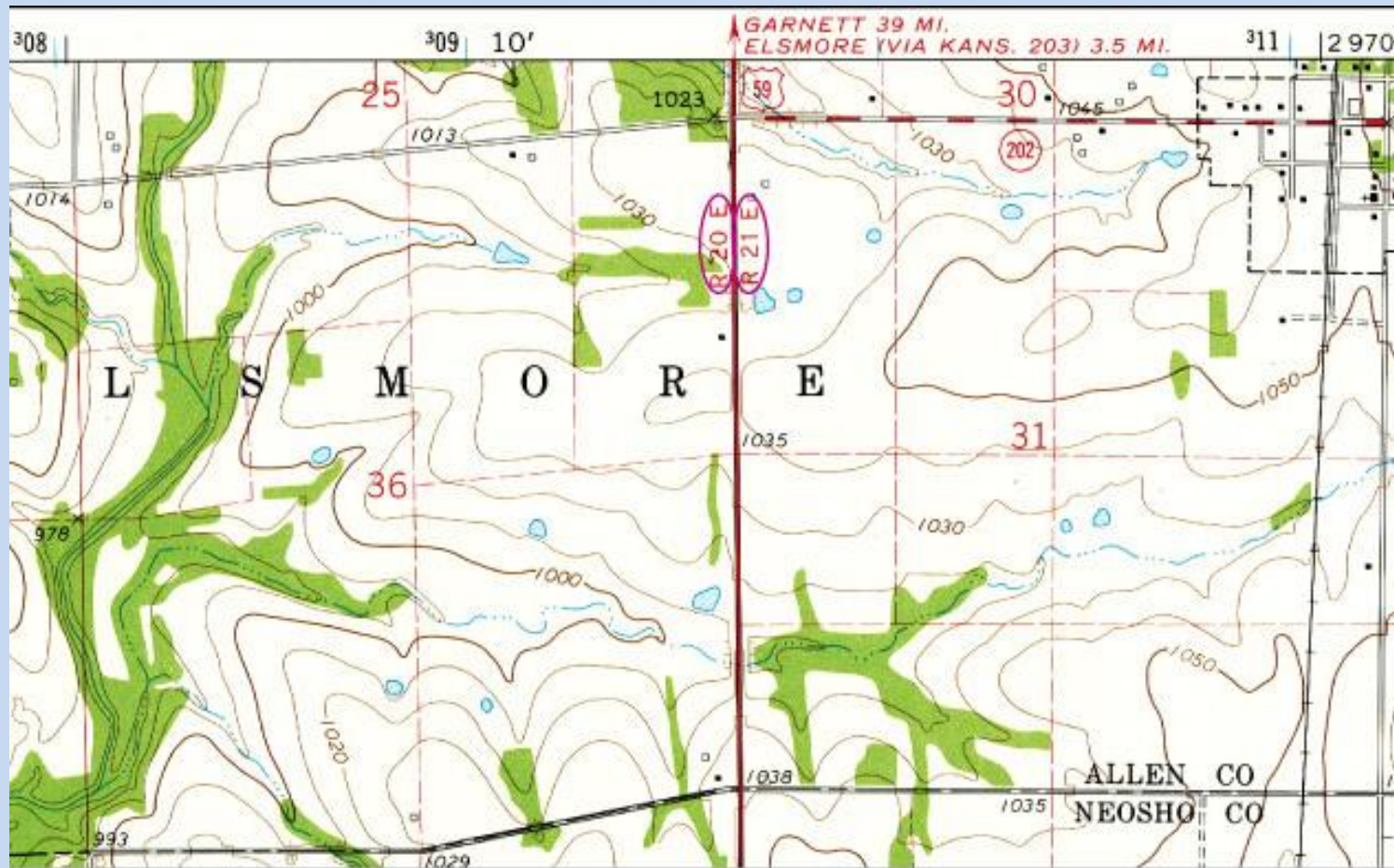
Church in Lone Star is in SE NE NE sec. 1, T.14S., R.18E.

Pond is in SW SW sec. 36, T.13S., R.18E.

Common Mistakes Made when reporting section, township, & range:

- Listing quarters in the wrong order (must be smallest to largest, left to right).
- Switching township and range numbers.
- Mislabeling ranges as to East and West.
- Designating two townships and two ranges (a section can only be in one township, which is designated by one township number and one range number).

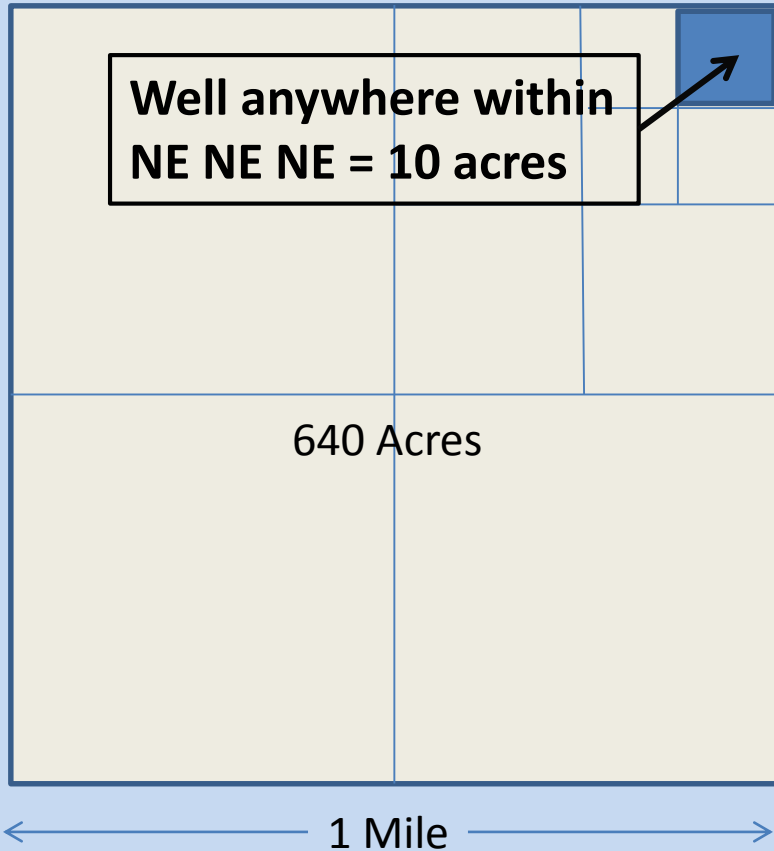
Irregularities



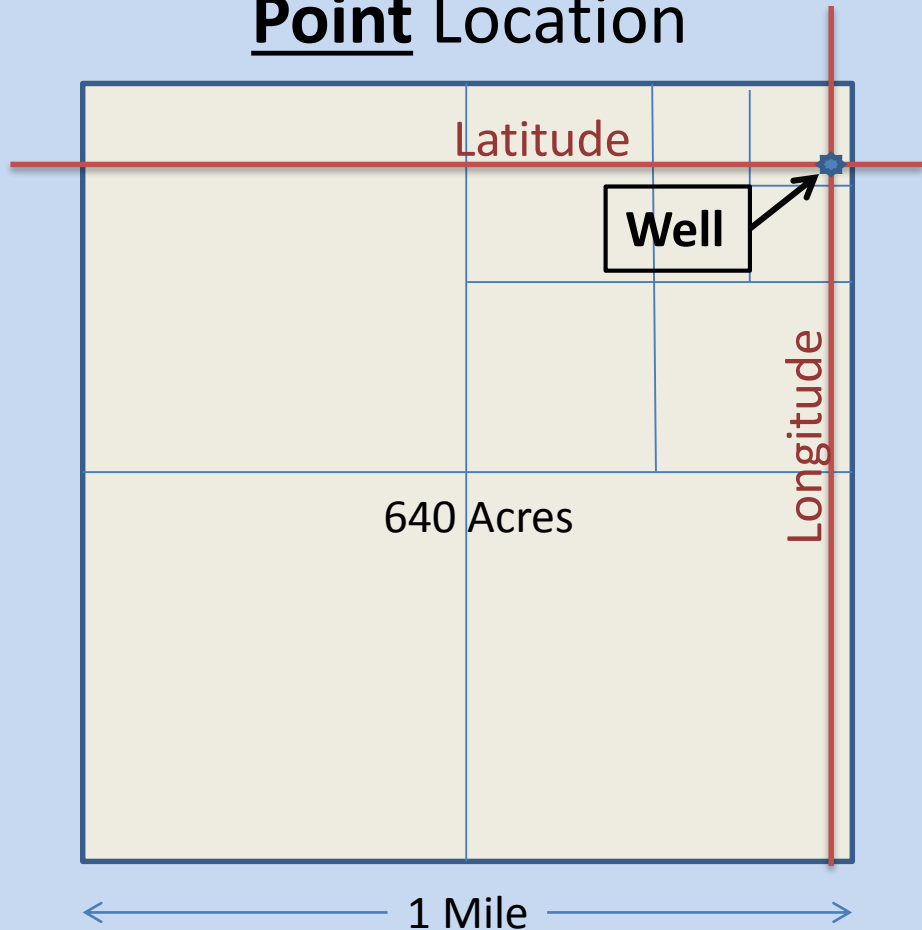
- Edges of the state
- Military properties (e.g., Fort Riley)
- Major Rivers
- Range 8 East
- Irregular sections (surveying adjustments)

Well Location

Quarter Calls =
Area Location

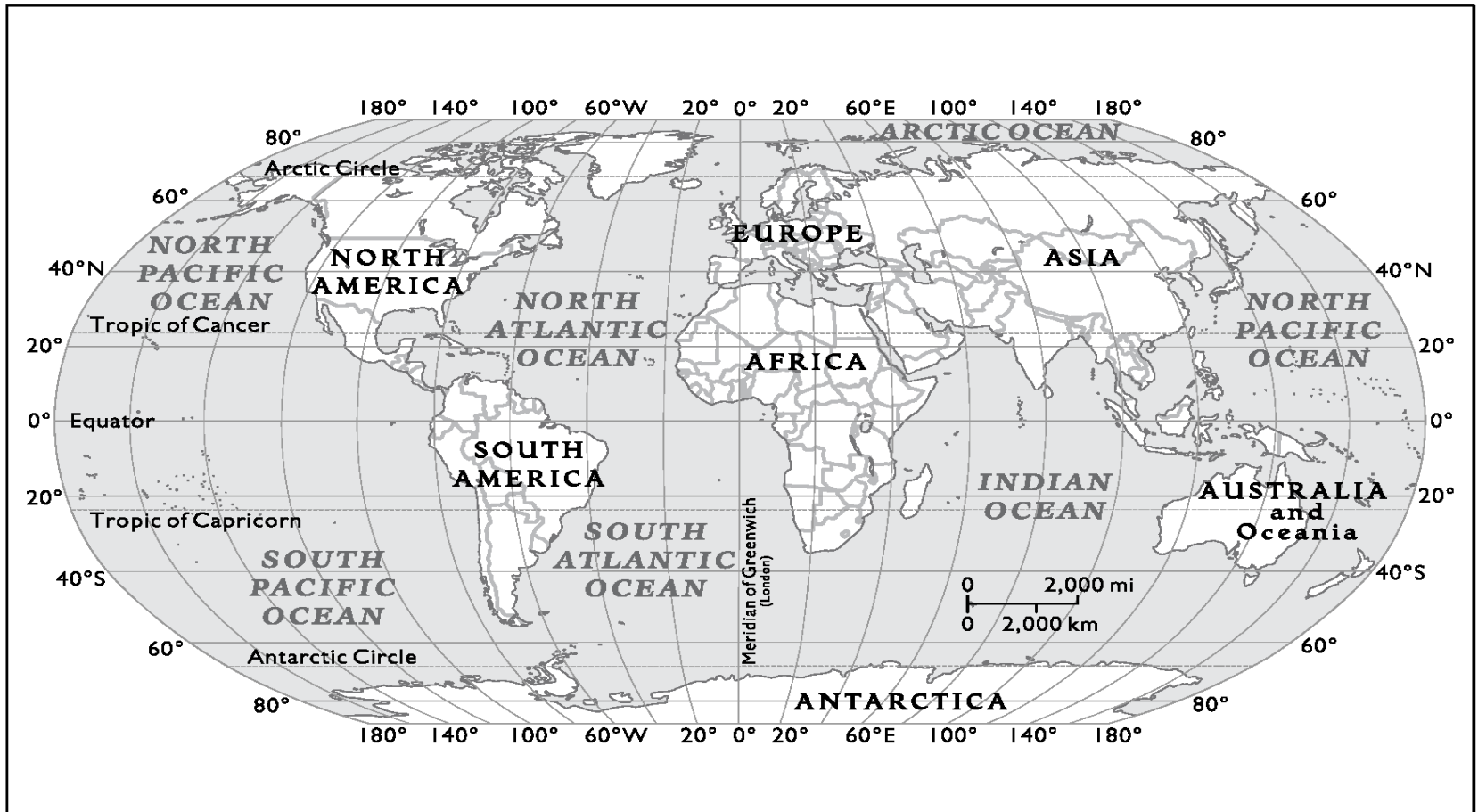


Latitude/Longitude =
Point Location

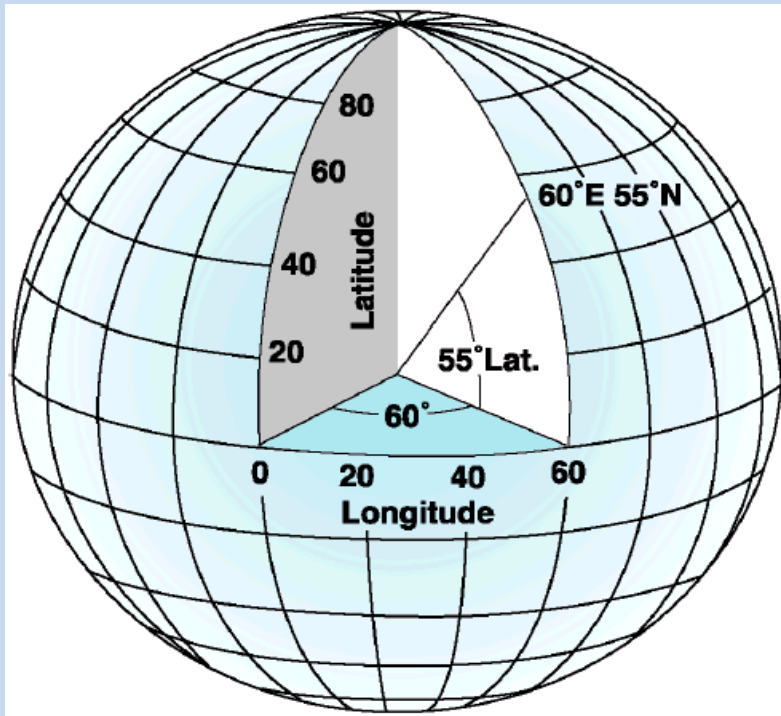


(Still required to include written location and/or address on WWC-5)

Latitude and Longitude



Sphere Models and Geographic Latitudes and Longitudes



Intersection between a parallel (latitude) and meridian (longitude) defines a location.

Only need two angles—latitude and longitude

Prime Meridian—The Royal Greenwich Observatory



(Slide courtesy of Dr. Xingong Li
KU Department of Geography)

The Austin Capitol Dome Liberty Star Horizontal Control Station (The star in the hand of the Goddess of Liberty)

Datum	Coordinate System	Coordinates	Units
NAD 83	Geodetic Latitude, Longitude	30:16:28.82 N, 97:44:25.19 W	deg:min:sec
NAD-27	Geodetic Latitude, Longitude	30:16:28.03 N, 97:44:24.09 W	deg:min:sec
WGS-72	Geodetic Latitude, Longitude	30:16:28.68 N, 97:44:25.75 W	deg:min:sec
NAD-83	UTM Easting, Northing, Zone	621160.98, 3349893.53 14 R	meters
NAD-27	UTM Easting, Northing, Zone	621193.18, 3349688.21	meters
NAD-83	Military Grid Reference System	14RPU2116149894	meters
NAD-27	Military Grid Reference System	14RPJ2119349688	meters
NAD-83	State Plane, TX C 4203 Easting, Northing	949465.059, 3070309.475	meters
NAD-27	State Plane, TX C 4203 Easting, Northing	2818560.55, 230591.76	feet
NAD-83	State Plane, TX SC 4204 Easting, Northing	721201.977, 4271229.432	meters
NAD-27	State Plane, TX SC 4204 Easting, Northing	2397741.25, 889749.98	feet
WGS-72	World Geographic Reference System	FJHA1516	deg. and min.
	VOR-DME Bearing, Distance, VOR ID	230.46, 2.271, 114.6 Ch.93 AUS	deg,nmi,id
	Loran-C GRI 7980 W, X, Y, Z TDs	10998.9,24795.0,47040.8,63902.3	microsec.
	U.S. Postal Zip Code (5-digits)	78705	

One Location Described by Different Coordinate Systems

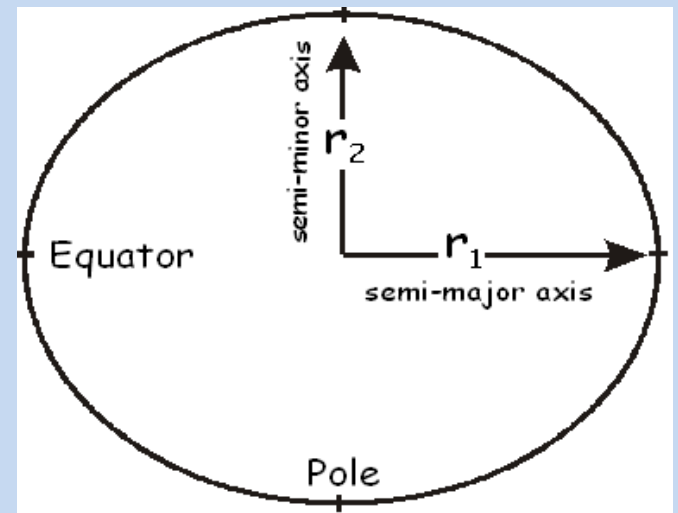
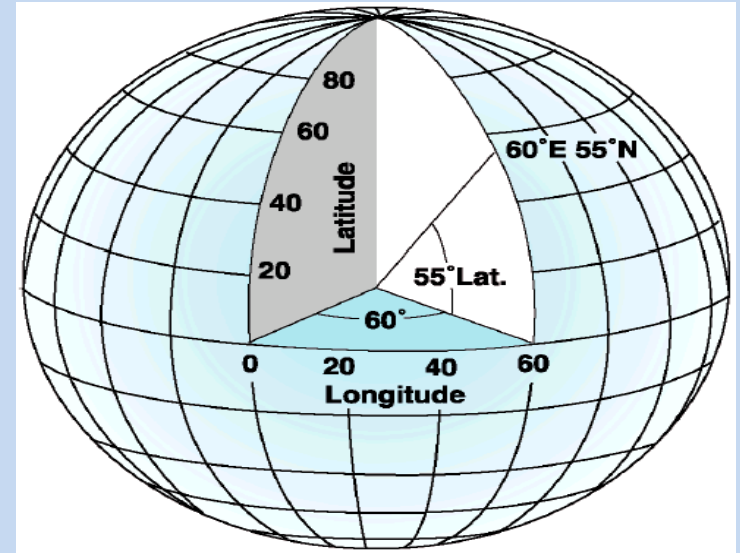
P. H. Dana 8/20/98

(Peter H. Dana, The Geographer's Craft
Project, Department of Geography, The
University of Colorado at Boulder)

Ellipsoid Models and Datums

Horizontal Datum = Reference Grid System Used to Describe Points on the Surface of the Earth

- Newton (1670) suggested an ellipsoidal earth due to centrifugal force (wider at the equator).
- **NAD 27** (North American Datum 27) – Clarke Spheroid.
- **NAD 83** (North American Datum 83) – GRS 1980 Ellipsoid.
- **WGS 84** (World Geographic Reference System) – WGS 1984 Ellipsoids.



(Modified from Dr. Li)

Horizontal Datums Commonly Used for Kansas

- NAD 27 (North American Datum of 1927)
 - Based on Clark ellipsoid of 1866
 - Reference point: Meades Ranch, Kansas
 - Control points surveyed on the ground - **stationary**
 - Kansas Geological Survey online data is in NAD 27
 - NAD 83 and WGS 84 coordinates are converted to NAD 27 coordinates
- NAD 83 (North American Datum of 1983)
 - Based on earth-centered Geodetic Reference System of 1980 (GRS 1980)
 - Developed using satellite observations
 - Tied to North American tectonic plate - **stationary**
- WGS 84 (World Geodetic System 1984)
 - Based on WGS 84 ellipsoid
 - Globally Based, uses Satellites
 - Tied to relative positions of Earth's tectonic plates - **it moves!**
 - GPS Units' usual default , also Google Earth's
- **Note: KGS cannot not use Lat/Long's submitted without horizontal datum -- location of well will default to PLSS location**

The Point of Origin

- The mother of all other control points for NAD 27
- Determined by celestial observations

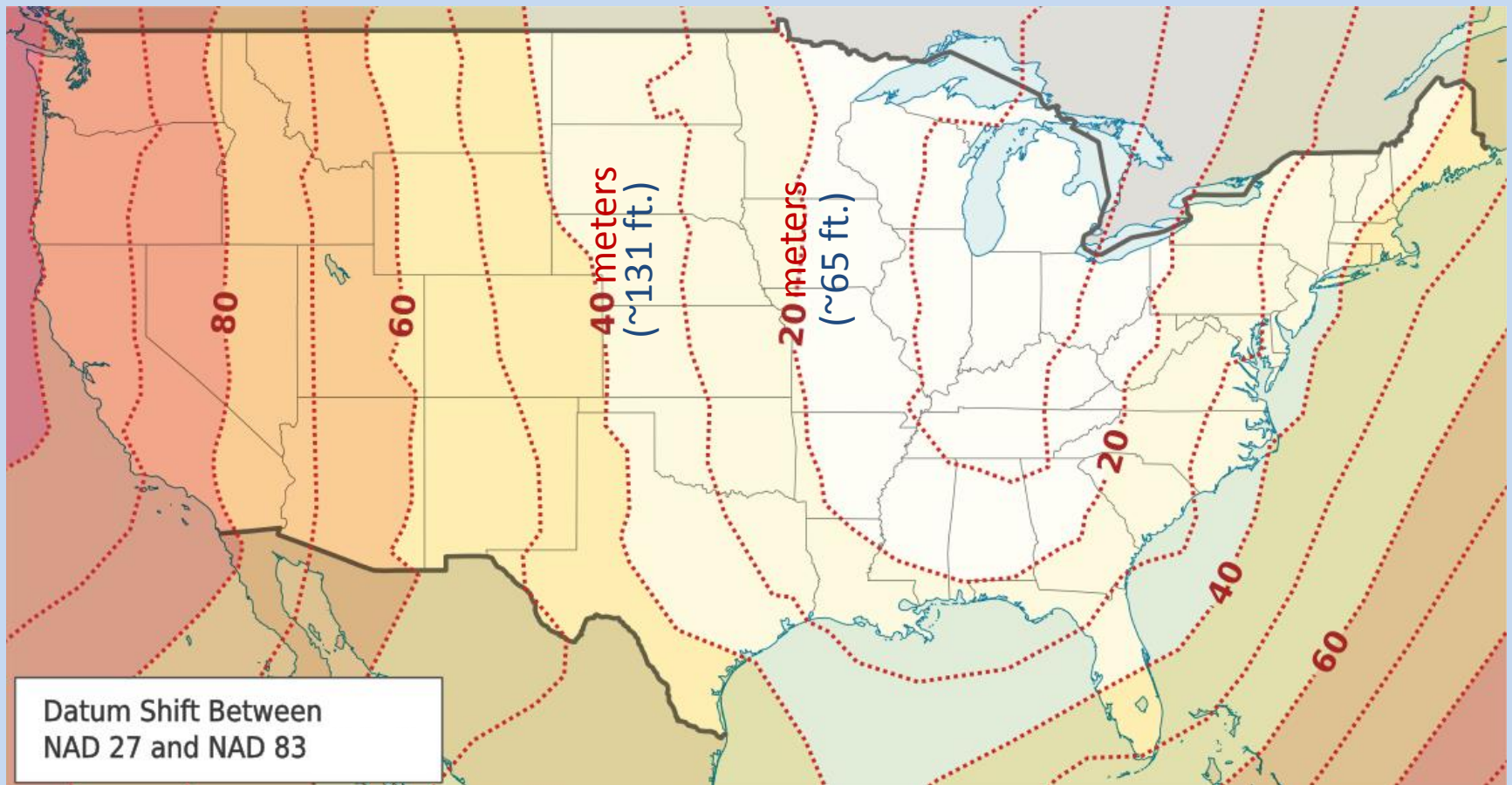


Meades Ranch in Kansas for NAD27 (12 miles north of Lucas, KS)

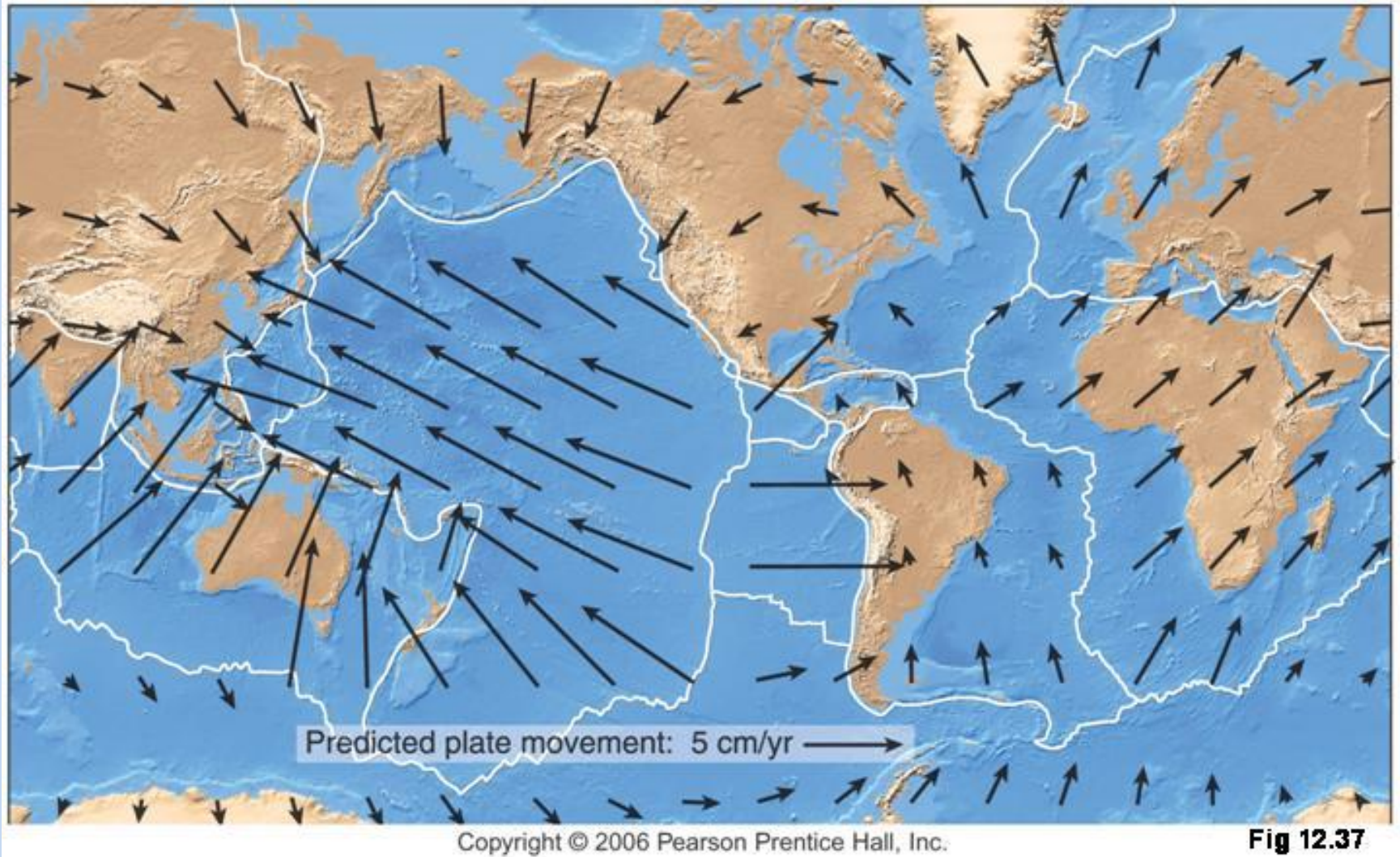
(Slide courtesy of Dr. Xingong Li,
KU Department of Geography)

Datum shift between NAD27 and NAD 83

- Horizontal Datum Shift: **same coordinates with different horizontal datums result in different locations**



Movement of Earth's Tectonic Plates

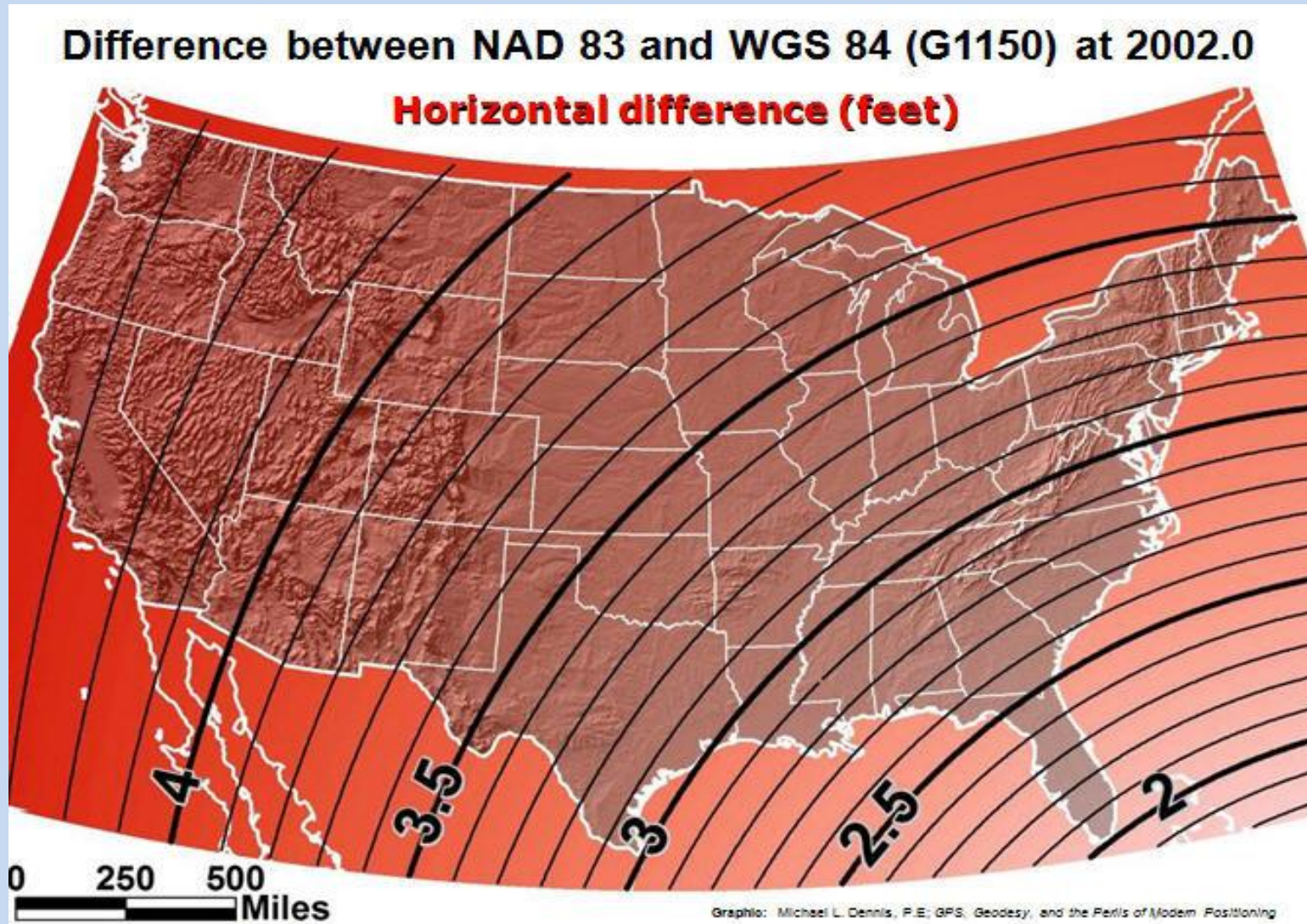


- WGS 84 Horizontal Datum is tied to the relative rate of movement of the tectonic plates, but its reference pole, meridian, and equator are very close to the geographic north pole, the Greenwich Prime Meridian, and the geographic equator. Other places on Earth's surface move relative to that reference ellipsoid.

(Credit: Pearson Prentice Hall, Inc.)

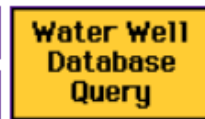
Datum shift between NAD 83 and WGS 84

NAD 83 and WGS 84 initially were nearly identical, but not now



(Graphic from: <http://www.spatial-ed.com/datums/datums-basics/532-convert-wgs84-nad83.html>)

KGS Individual Water Well Web Page



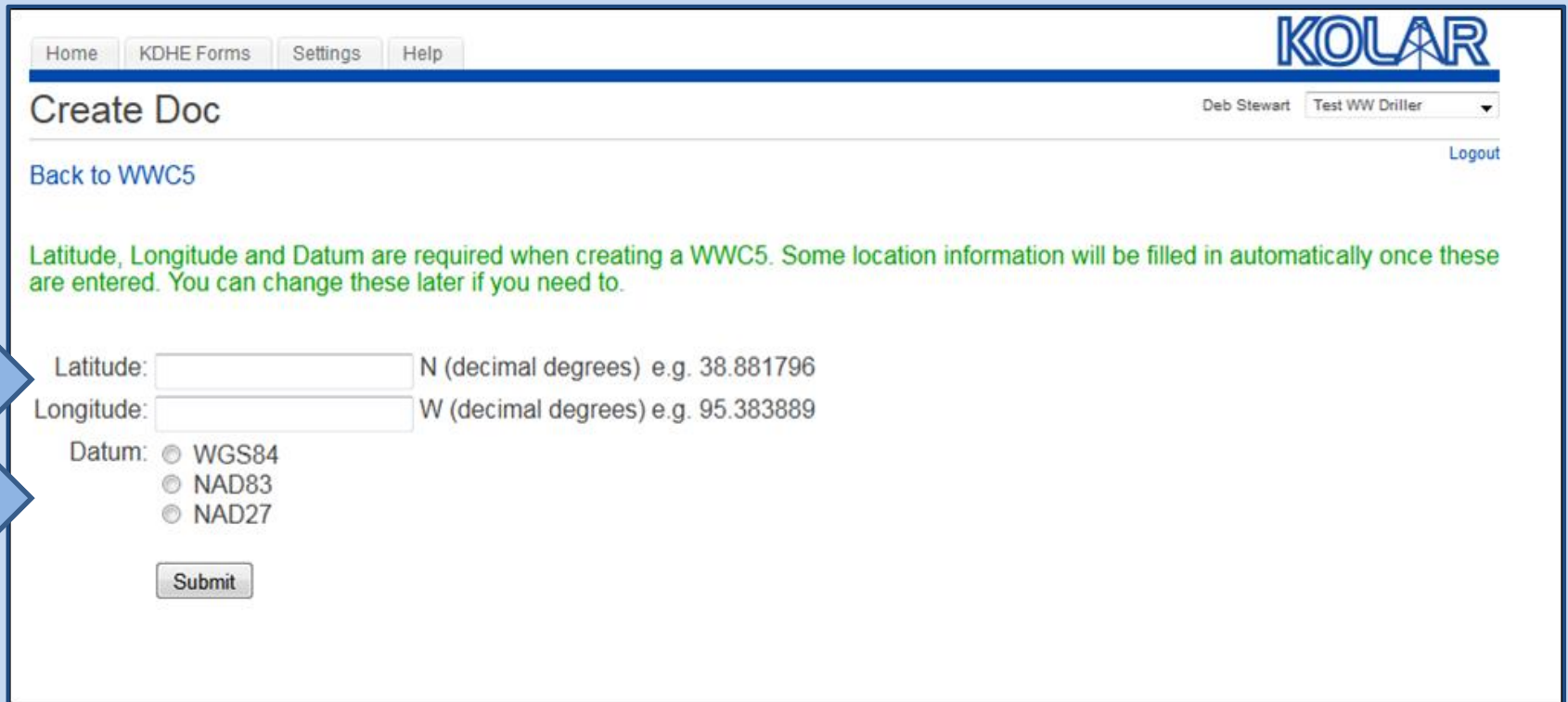
Specific Water Well Detail

Well T27S, R3E, Sec. 11, NE SW NE NW, Action: Constructed

Location Info		
Owner: Parks	Status: Constructed	
Location: T27S, R3E, Sec. 11, NE SW NE NW	County: Butler	
Directions: 12722 SW Wagon Wheel Rd, Andover		
Longitude: -97.0740786	Latitude: 37.7209832	Datum NAD 27
Longitude and latitude from GPS measurements.		
GPS Longitude: -97.0744	GPS Latitude: 37.721	Datum WGS84
View well on interactive map This link will create a new window and display an interactive map of this well and its neighbors.		
General Info		
Well Depth: 310 ft.	Elevation: 1287 ft.	
Static Water Level: ft.	Est. Yield: gpm.	
Comp. Date: 17-Mar-2016	Well Use: Geothermal, Closed Loop, Vertical	
DWR Applic. #:	Other ID:	

Now shows Lat/Long values for two horizontal datums
(if you don't give us datum, it will calculate lat/long in NAD 27 from PLSS)

KOLAR Requires Latitude, Longitude and a Horizontal Datum



The screenshot shows the KOLAR web application interface. At the top, there is a navigation bar with links for Home, KDHE Forms, Settings, and Help. The KOLAR logo is on the right. Below the navigation bar, the page title is "Create Doc". On the right side of the page, there is a user profile for "Deb Stewart" with a dropdown menu showing "Test WW Driller" and a "Logout" link. A green message states: "Latitude, Longitude and Datum are required when creating a WWC5. Some location information will be filled in automatically once these are entered. You can change these later if you need to." Below this message, there are input fields for Latitude and Longitude, each followed by a label indicating the unit and an example value. The Latitude field is followed by "N (decimal degrees) e.g. 38.881796" and the Longitude field is followed by "W (decimal degrees) e.g. 95.383889". Below these fields, there is a "Datum:" label followed by three radio button options: "WGS84", "NAD83", and "NAD27". A "Submit" button is located at the bottom of the form. Two blue arrows point to the Latitude and Longitude input fields.

Home KDHE Forms Settings Help

KOLAR

Create Doc Deb Stewart Test WW Driller

Logout

Back to WWC5

Latitude, Longitude and Datum are required when creating a WWC5. Some location information will be filled in automatically once these are entered. You can change these later if you need to.

Latitude: N (decimal degrees) e.g. 38.881796

Longitude: W (decimal degrees) e.g. 95.383889

Datum: ☐ WGS84
☐ NAD83
☐ NAD27

Submit

Datum = Reference Grid System Used to Describe Points on the Surface of the Earth

KOLAR



Required



Questionable



Invalid



Associated fields

[View Location Info](#)[Save and Exit](#)

WATER WELL RECORD Form WWC-5

Division of Water
Resources App. #

Well ID

☒ Original record ☐ Correction ☐ Change in well use

1 LOCATION OF WATER WELL:

Dickinson

Fraction (smallest-to-largest)

NW ¼

SW ¼

SE ¼

Section

34

Township

13

S

Range

2

☒ E ☐ W

2 WATER WELL OWNER:

First:

Last:

Business: Brown Memorial Foun

Address line 1: Box 187

Address line 2:

City: Abilene

State: Kansas

ZIP: 67410

3 WATER WELL ADDRESS:

Street/Rural Address of Well Location; if unknown,
distance & direction from nearest town or
intersection: If at owner's address, check here ☐

S. of Abilene on Buckeye Ave (K-15) 3 miles to 1900 Ave. then E.
one mile to 1935 Ave. then N. 100 yards to maintenance building.
S. of Abilene on Buckeye Ave (K-15) 3 miles to 1900 Ave. then E.
one mile to 1935 Ave. then N. 100 yards to maintenance building.

4

DEPTH OF COMPLETED WELL 70 ft.

Depth(s) groundwater encountered:

1) 46 ft. 2) ft. 3) ft. or 4) ☐ Dry well

WELL'S STATIC WATER LEVEL 43 ft.

☒ below land surface measured (mm/dd/yyyy) 04/27/201☐ above land surface measured (mm/dd/yyyy)

5 Latitude: 38.872553 (decimal degrees)


Longitude: 97.195086 (decimal degrees)

Datum: ☒ WGS84 ☐ NAD83 ☐ NAD27Source for latitude/longitude:☐ GPS (unit make/model)WAAS enabled? ☐ Yes ☐ No☐ Land survey ☐ Topographic map☒ Online mapper Google earth

HomeKDHE FormsSettingsHelp

KOLAR

20142012201020062002Topo



View Location InfoSave and Exit

Well IDThe First One

Section	Township	Range
35	13 S	18 <input checked="" type="radio"/> E <input type="radio"/> W

Click on
“View Location Info”
box to verify well
location.



▶ Water

High Plains/Ogallala Aquifer, WWC5, WIZARD, WIMAS, Publications, ...

▶ Energy

Oil and Gas Wells, Production, Interactive Maps, Other Projects, ...

▶ Geology

County Maps, County Bulletins, Publications, Nomenclature, ODYSSEY Archaeological Research, ...

▶ Geophysics

Russell 4D Seismic, Shallow Seismic, WinSeis, SurfSeis, Earthquakes, ...

▶ Publications

Bibliography, Open-file Reports, Maps/GIS, LEOWEB, Software, ...

▶ Education

GeoKansas, Library, Annual Field Conferences

▶ About the KGS

Positions Available, News, Staff Listing, FAQ, KGS Staff Only, ...

Geologic Map for Morris County Now Available



News

- ▶ **Magnitude 3.2 earthquake at 10:27 AM, Wed., Aug. 31, located 4 mi NNW of Ellis; details from [USGS](#).**
- ▶ **Magnitude 2.7 earthquake at 9:38 PM, Mon., Aug. 29, located 3 mi ENE of Caldwell; details from [USGS](#).**
- ▶ **Oil and gas production data through May 2016 added Aug. 27, 2016.**
- ▶ **New in "Current Research"--[Classification of Red Beds at Point of Rocks, Morton County, Kansas: A Historical Review](#), by Robert S. Sawin**
- ▶ **[Kansas Geological Survey Map Wins Awards at Professional Conference](#)**

Links



GeoKansas



Data Access and Support Center



[Kansas By County, State Geological Surveys,](#)
[Kansas Sites, Universities, Professional Organizations, more...](#)



LEOWEB V11.000

Lat/Long (D.dddd)

Lat/Long (DMS)

Lat/Long (DM.mm)

TRS_FT

TRS Q Calls

UTM

Help

About LEOWEB

REST Service

Enter Latitude and Longitude as Decimal Degrees

Datum Corner Session No -99999

Latitude

Longitude

Results String Enter values above and click "Submit" below to see results here.

Submit



Go

Actions

No data found.



LEOWEB V11.000

Lat/Long (D.dddd)	Lat/Long (DMS)	Lat/Long (DM.mm)	TRS_FT	TRS Q Calls	UTM	Help	About LEOWEB	REST Service
-------------------	----------------	------------------	--------	-------------	-----	------	--------------	--------------

Enter Latitude and Longitude as Degrees Minutes and Seconds

Datum

NAD27

 Corner

SE

 Session No -99999

Latitude Degrees

38

Minutes

39

Seconds

24.80

Longitude Degrees

-101

Minutes

31

Seconds

46.66

Results String

Enter values above and click "Submit" below to see results here.

Submit

Q-

Go

Actions



LEOWEB V11.000

Lat/Long (D.dddd)

Lat/Long (DMS)

Lat/Long (DM.mm)

TRS_FT

TRS Q Calls

UTM

Help

About LEOWEB

REST Service

Enter Latitude and Longitude as Degrees Minutes and Seconds

Datum Corner Session No 15828816009552Latitude Degrees Minutes Seconds Longitude Degrees Minutes Seconds

Results String

Input DMS Lat = 38 39' 24.8 Long = -101 31' 46.66
DD Lat: 38.656888 Long: -101.529627 Datum: NAD27
Kansas TRS: 16S38W16

Township: 16S Range : 38 W Section: 16
Spot Footages from SE Corner: 592 N 4718 W
Spot: Center of NE SW SW SW

Section is approximately 645 acres
Length of north line = 5264 Ft
Length of south line = 5305 Ft
Length of east line = 5319 Ft
Length of west line = 5314 Ft

Submit



Go

Actions

The Global Positioning System (GPS)



A user's GPS device receives signals from satellites operated by the U.S. government, and uses that information to calculate the user's position and time.

(Image from <http://www.gps.gov/systems/gps/>)

WHAT IS GPS?

The Global Positioning System (GPS) is a U.S.-owned utility that provides users with positioning, navigation, and timing (PNT) services.

This system consists of three segments:

- the space segment
- the control segment
- the user segment

The U.S. Air Force develops, maintains, and operates the space and control segments.

GPS technology is now in everything from cell phones and wristwatches to bulldozers, shipping containers, and ATM's.

GPS Space Segment

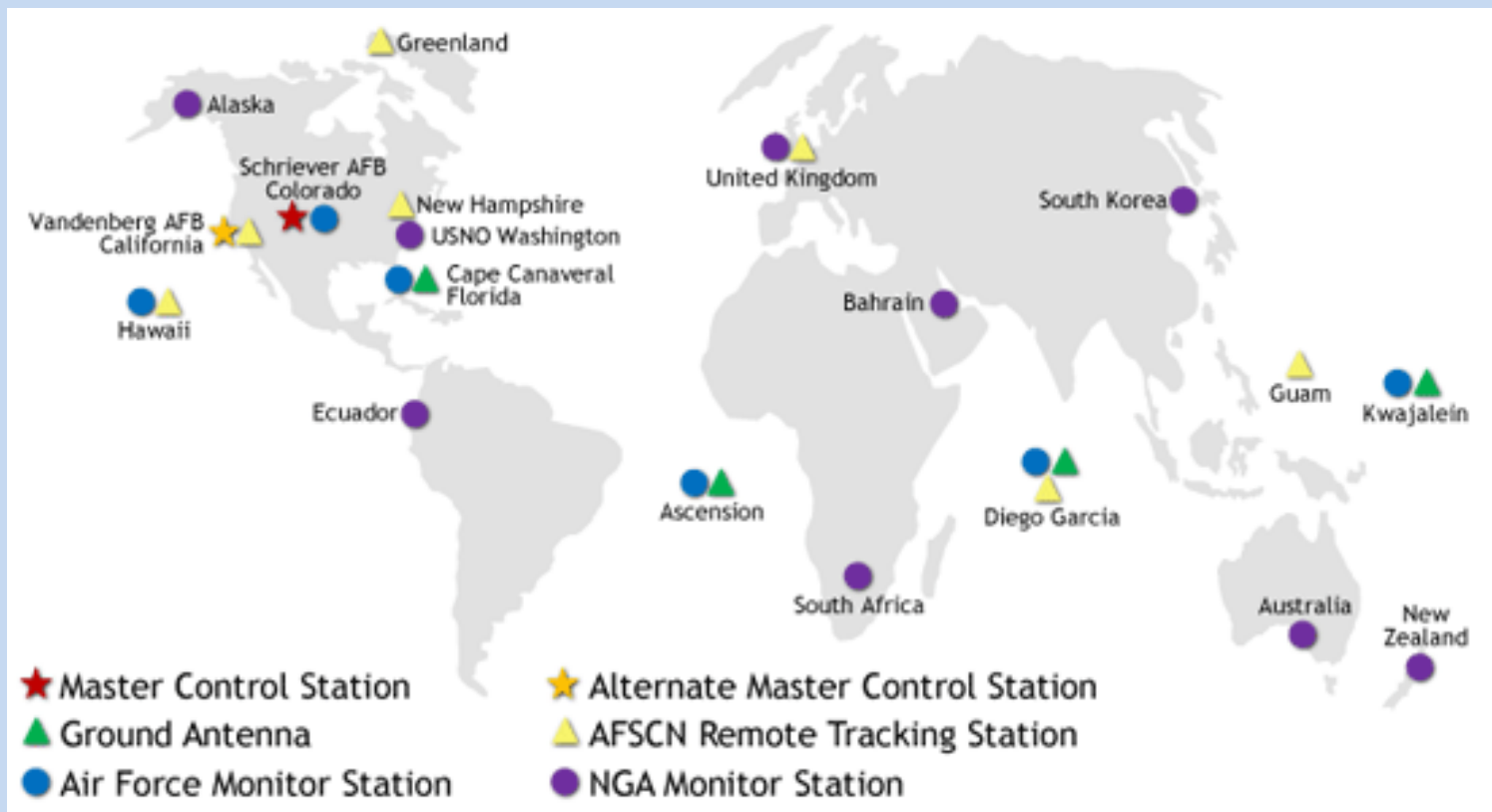
- A satellite-based global positioning system.
- It uses **distance measurements** to determine locations in 3-dimensional space.
- Typically it uses data from 4 different satellites that are part of a 24-satellite constellation.



(Slide courtesy of Dr. Xingong Li
KU Department of Geography)

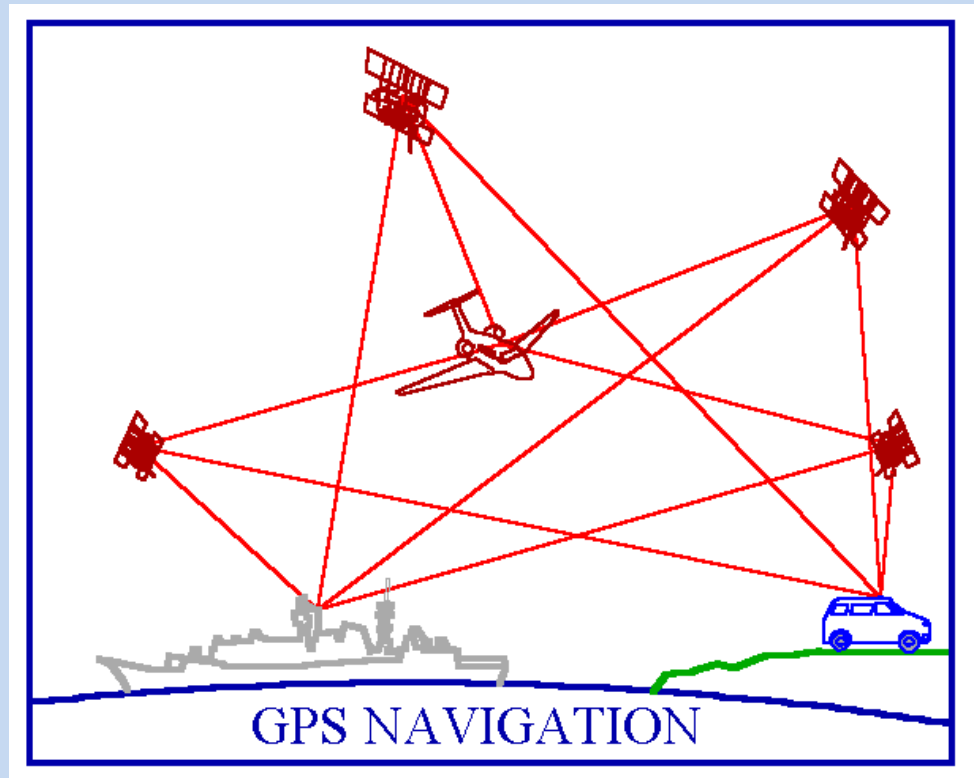


GPS Control Segment




GPS User Segment

GPS receivers record data transmitted by satellites and process the data to obtain position



(Slide adapted from Dr. Xingong Li
KU Department of Geography)

Report Latitude and Longitude on WWC-5 using Decimal Degrees

- Report Latitude and Longitude in Decimal Degrees
 - Decimal Degrees (DD.dddd) **REQUIRED for KOLAR**
 - 35.7722°
 - Degrees, Minutes, and Seconds (DMS)
 - 35° 46' 20"
 - Degrees, Decimal Minutes(DM.mm)
 - 35° 46.3333'
- To convert between styles:
 - DMS \leftrightarrow DD (You cannot just move the decimal!)
 - [LEOWEB](http://chasm.kgs.ku.edu/ords/f?p=120418) conversion program on the KGS Website:
<http://chasm.kgs.ku.edu/ords/f?p=120418>
 - Decimal Degrees = Degrees + Minutes/60 + Seconds/3600
 $35 + 46/60 + 20/3600 = 35.7722^\circ$
 - **OR, Divide seconds by 60, add the result to minutes and divide the sum by 60, then add the total to the degrees.**
 - Conversion program from FCC: <https://www.fcc.gov/media/radio/dms-decimal>
-  Set your GPS unit to display Decimal Degrees

Handheld GPS units



- Come in a variety of sizes and styles

(Images from Garmin.com website)

Using GPS to Collect Latitude & Longitude for WWC-5s

- On your GPS, change your Settings to display **DECIMAL DEGREES** using your Menu > Options.
- Note your **HORIZONTAL DATUM**: check settings or user manual, **most default to WGS 84**.
- Google Earth uses WGS 84.
- KGS online data are all in NAD 27; for consistency all coordinates are converted to NAD 27 from datum submitted. Water well records on KGS website also show coordinates as originally submitted by the driller.

If you have a Garmin GPS unit, their
instructions say:
“Position Format Settings”

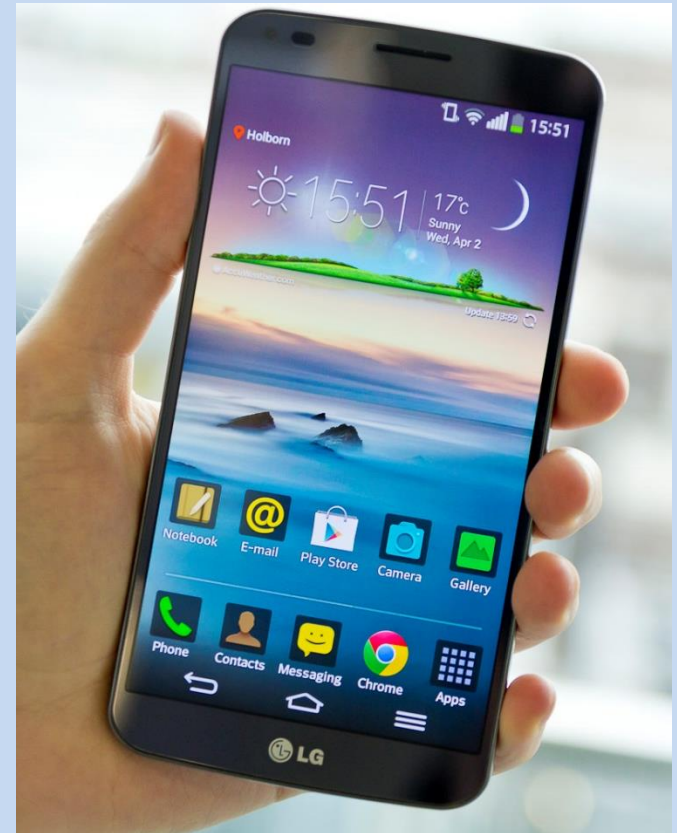
- “From the app drawer, select **Setup > Position Format**
- **Position Format:** Sets the position format in which a location reading appears.
- **Map Datum:** Sets the coordinate system on which the map is structured.
- **Map Spheroid:** Shows the coordinate system the device is using. The default coordinate system is WGS 84.



(Instructions copied from Garmin Oregon 700 Series Owner's Manual)

Mobile Phone App

- Software applications for smartphones and tablet computers.
- Many apps available. Some free, others minimal fee.
- Good accuracy if satellite coverage available. Find one that displays accuracy, and then monitor and record it when taking a reading.
- Satellites, instead of cell phone tower relays.
- Email coordinates and/or store them.
- **Read Settings, Help and FAQ pages for best results.**
- **Adjust settings.**
- Verify location by entering Latitude and Longitude to Google Earth, Find Latitude Longitude, or on KOLAR.

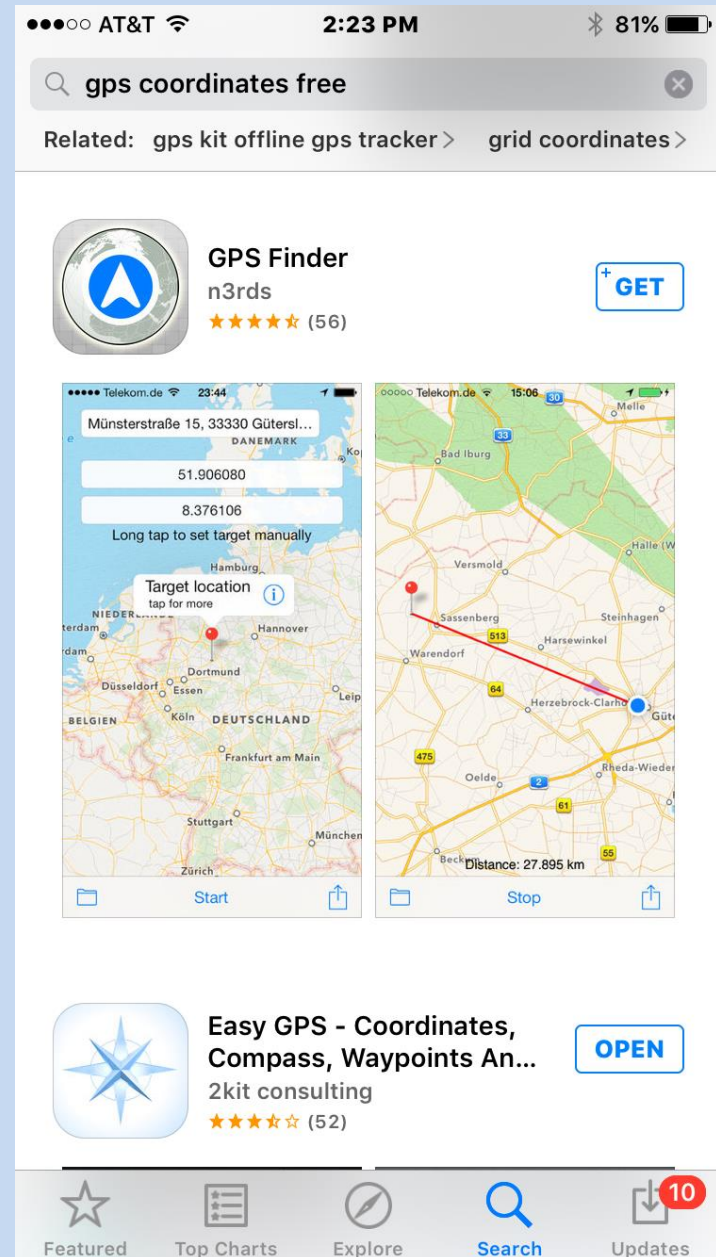


- They can drain your battery – carry a charger, or turn off the location function when not using.

Mobile Phone Apps

- Finding a program

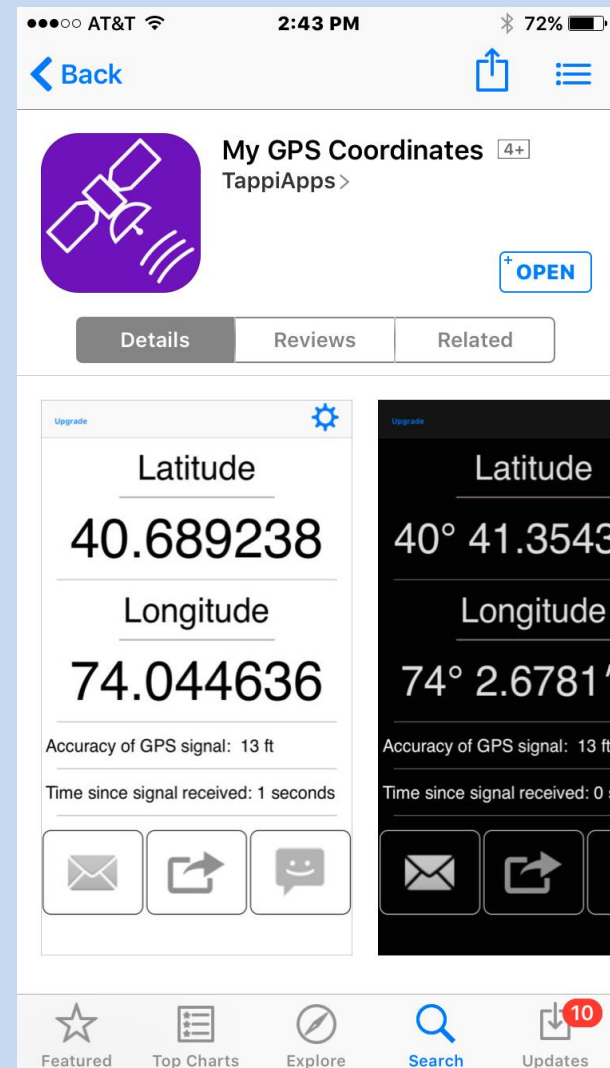
- On App Store go to Search, for example “GPS Coordinates Free”
- Tap an App in search results to view details, scroll sideways and down
- Purpose of App
- Date of updates
- Read reviews
- Download & Install



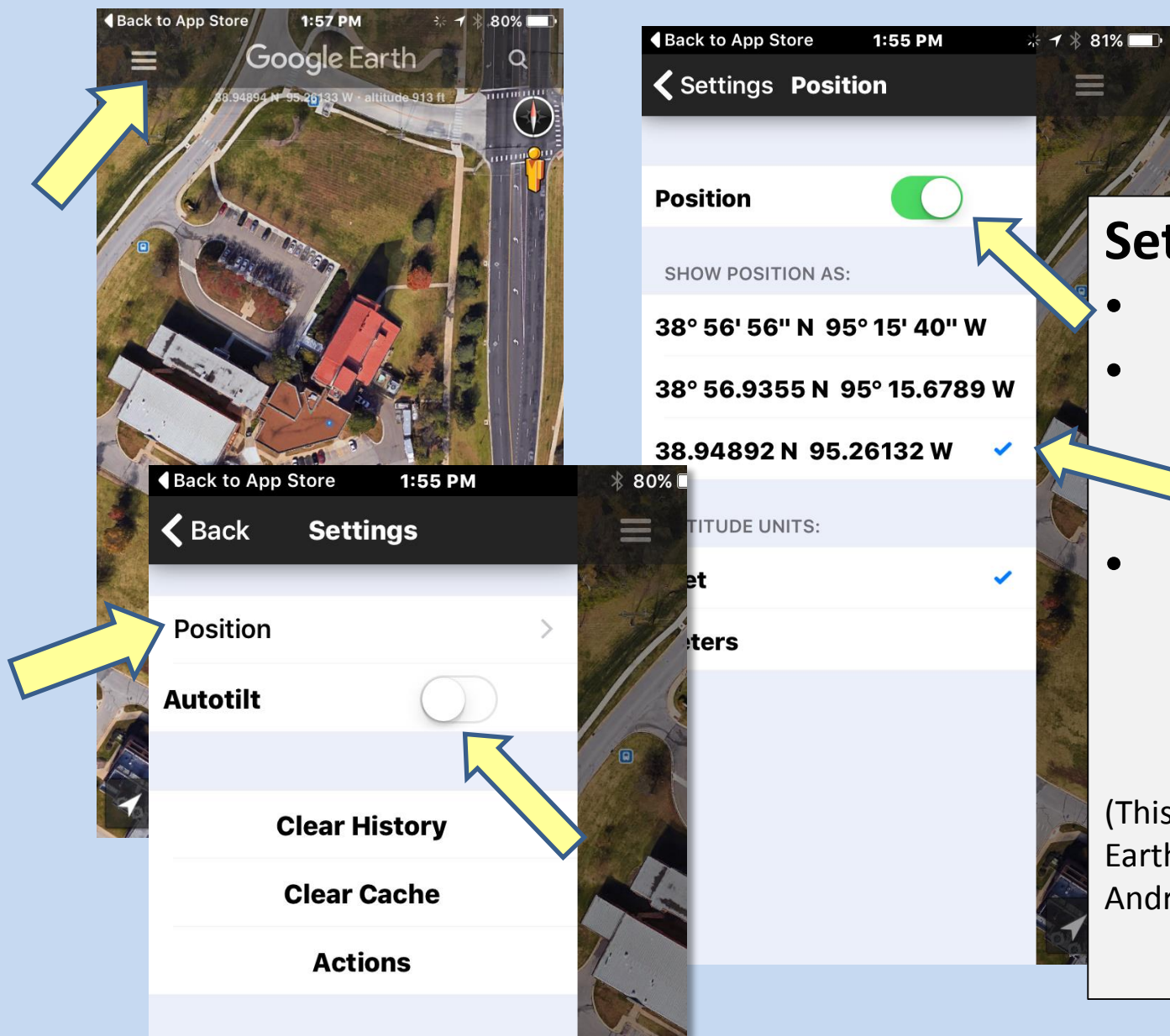
Mobile Phone Apps

- Read Details, Help, Settings, etc.

- Tap an App in search results to view details, scroll sideways and down,
- Open App information on your computer to get a comprehensive view.
- Check settings, (three bars).



Q Which Datum is used?
A WGS 84



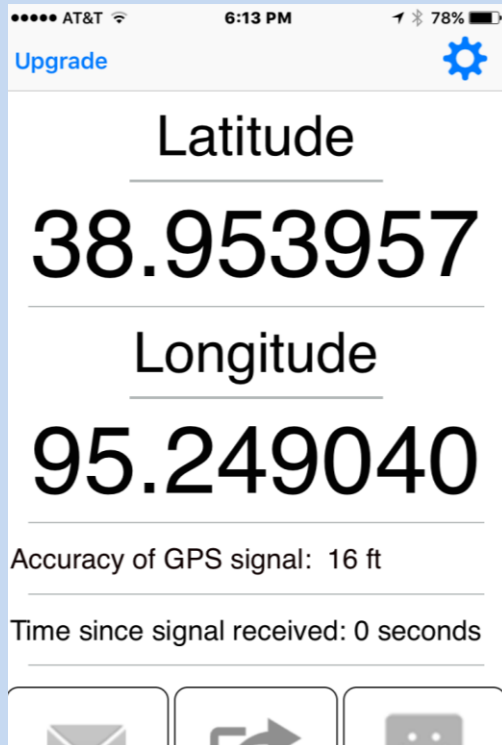
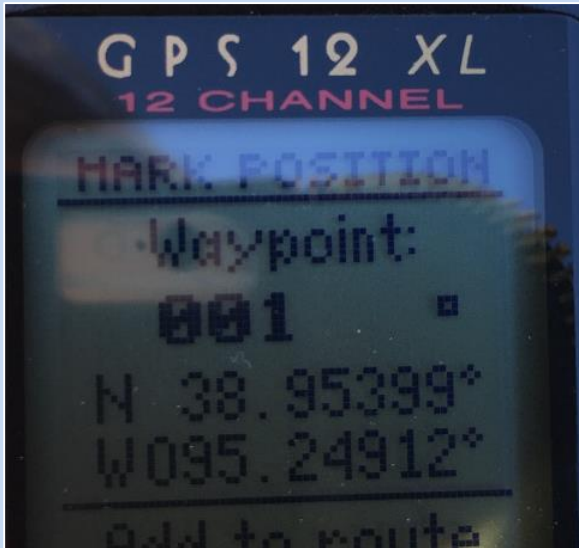
Settings:

- Position > ON
- Choose Decimal Degrees
- Turning Autotilt OFF is helpful

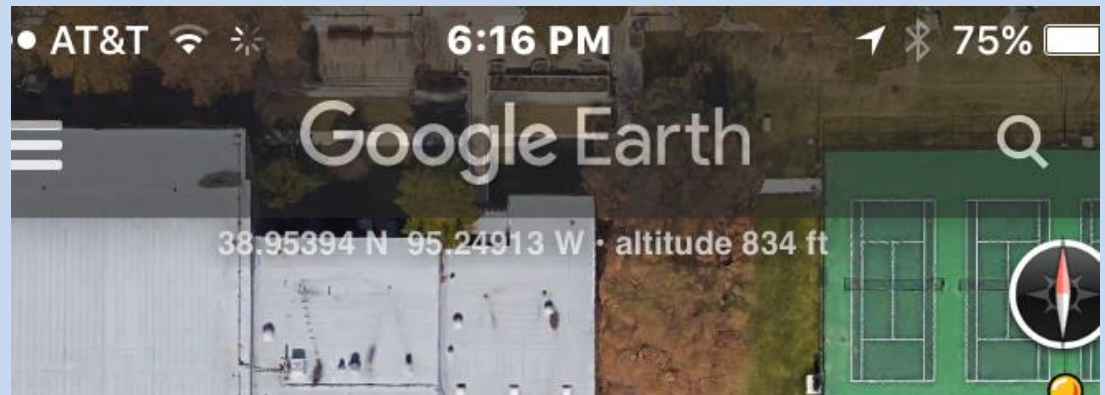
(This example is Google Earth on an I-Phone. Android phones)

3-Bar Icon > Layers > Settings > Position

Smart Phone App's vs. GPS



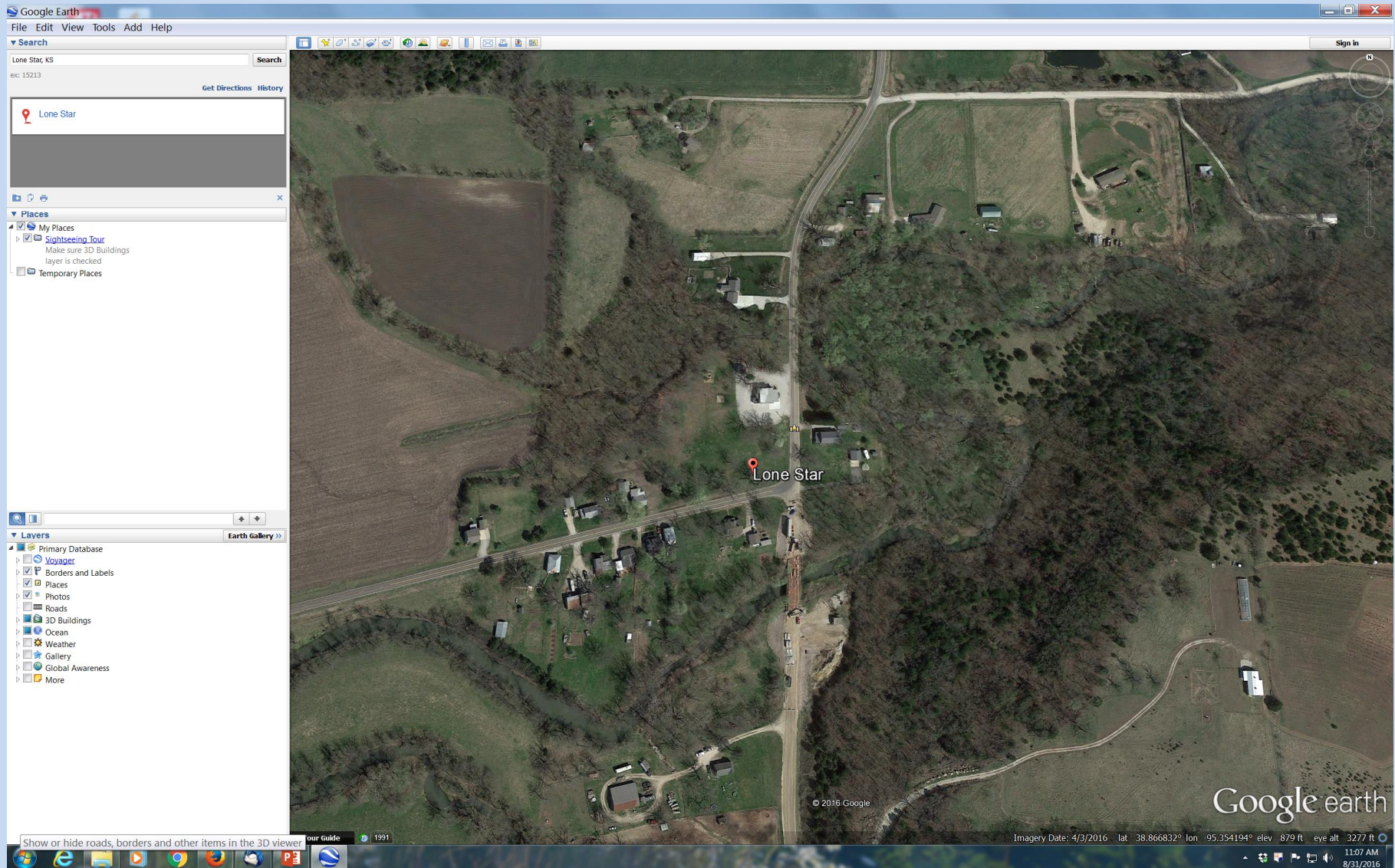
	Latitude	Longitude
Google Earth I-Phone	38.95394	95.24913
My GPS Coordinates	38.953957	95.249040
Garmin GPS 12XL	38.95399	95.24912



5 decimal places accurate to about one meter

(tappiapps.com)

Google Earth



Uses WGS 84

<https://www.google.com/earth/>

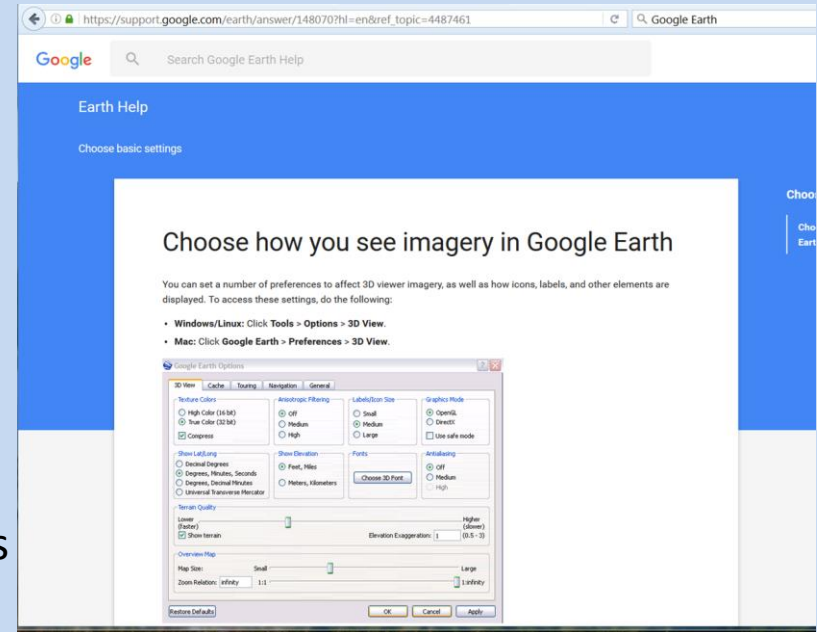
Lat/Long shown in lower right of screen



Note that the settings display lat/long in decimal degrees

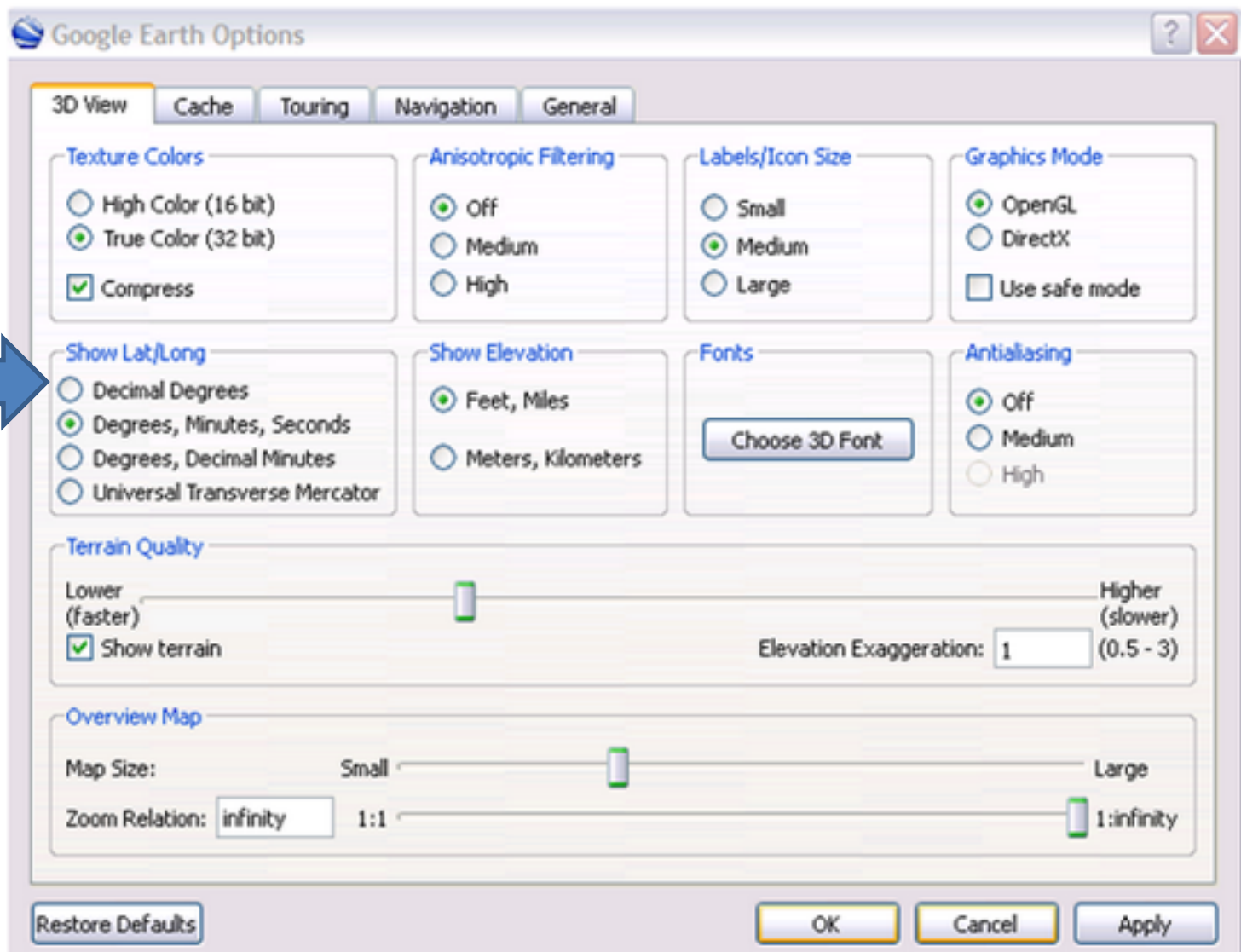
Tips for Using Google Earth on your Computer

- <https://www.google.com/earth/>
- Google Earth uses datum WGS 84
- Change Display to Decimal Degrees:
 - Click Tools Tab > Options > 3D View
 - Show Lat/Long: select >Decimal Degrees
- Stop Tilt when Zooming:
 - Click Tools Tab > Options > Navigation
 - Navigation: select >Do Not Automatically Tilt While Zooming
- Zoom to a Location: enter Latitude, space, –Longitude (as a negative value) in the Location Search Bar to verify a location.
- If coordinates (latitude & longitude) are collected from Google Earth and submitted on KOLAR or a WWC-5, report WGS 84 as the Horizontal Datum.



Google Earth Preferences

- **Windows/Linux:** Click **Tools > Options > 3D View**.
- **Mac:** Click **Google Earth > Preferences > 3D View**.



Data Resources Library, Kansas Geological Survey



Questions? Need help?

Data Resources Library at the Kansas Geological Survey:

- Open 8-12 and 1-5 Monday to Friday
- Phone: 785-864-2161
- Email: datares@kgs.ku.edu
- Seminar presenters:
Dan Suchy and Deb Stewart

Kansas Geological Survey Website:

- <http://www.kgs.ku.edu>

Water Well Completion Form (WWC-5)
Database with Interactive Mapper:

- <http://www.kgs.ku.edu/Magellan/WaterWell/index.html>

Selected References

- Coordinate Systems Overview - University of Colorado
<http://www.colorado.edu/geography/gcraft/notes/coordsys/coordsys.html>
- Geodetic Datum Overview - University of Colorado
Boulder<http://www.colorado.edu/geography/gcraft/notes/datum/datum.html>
- GPS.gov (Official U.S. Government information about the Global Positioning System (GPS) and related topics)
<http://www.gps.gov/systems/gps/>